CURTIS'S

BOTANICAL MAGAZINE,

ILLUSTRATING AND DESCRIBING

Plants of the Royal Botanic Gardens of Kew,

AND OF OTHER BOTANICAL ESTABLISHMENTS;

EDITED BY

SIR DAVID PRAIN, C.M.G., C.I.E., LL.D., F.R.S.,

DIRECTOR, ROYAL BOTANIC GARDENS, KEW.

VOL. XV.

OF THE FOURTH SERIES.

(Or Vol. CXLV. of the Whole Work.)

The living herbs, profusely wild
O'er all the deep-green earth, beyond the power
Of botanist to number up their tribes.—THOMSON.

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Tab. 8786.

RHODODENDRON auriculatum.

Central China.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.; Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron auriculatum, *Hemsl. in Journ. Linn. Soc.* vol. xxvi. p. 20 (1889); *Hemsl. et E. H. Wils. in Kew Bull.* 1910, p. 108; *Rehd. et E. H. Wils. in Sargent, Plant. Wils.* vol. i. p. 544 (1913); *Millais, Rhodod.* p. 125, cum icon. col.; species foliis magnis basi auriculato-cordatis costa infra pilosis corollis albis 7-lobis distinctissima.

Frutex vel *arbor* usque ad 9·5 m. alta (*Henry*); ramuli robusti, vetustiores brunnei, glabri, annotini vestigiis pilorum pustulati, hornotini pilis glandulosis longissimis dense hirsuti. *Folia* oblonga vel elliptico-oblanceolata, apice rotundata et apiculata, basi rotundata vel plerumque cordata, 15–25 cm. longa, 4·5–7 cm. lata, chartacea, primum utrinque infra dense pilosa, demum fere glabra costa pilosa excepta; costa supra angusta, infra conspicua, prope basin circiter 3 mm. lata; nervi laterales patuli, utrinsecus circiter 18, valde reticulati, graciles; petioli 2·5–4 cm. longi, glabri; gemmae axillares parvae, ovoideae, glabrae, circiter 6 mm. longae. *Inflorescentia* terminalis, 5–10-flora, usque ad 22 cm. expansa. *Flores* albi, odorati, breviter racemosi; pedicelli robusti, 2–3 cm. longi, pilis glandulosis longissimis dense villosi. *Calyx* variabilis, breviter vel longe lobatus, lobis usque ad 7 mm. longis linearibus dorso glanduloso-pilosis. *Corollae* tubus infundibuliformis, 4·5–5 cm. longus, extra parce setulosus ore aperto circiter 4 cm. diametro; lobi 7, patuli, late ovato-orbiculares, circiter 3·5 cm. longi. *Stamina* 14, breviter exserta; filamenta subaequalia, glabra; antherae ochraceae, 4 mm. longae. *Ovarium* 7–8-loculare, dense glanduloso-pilosum; stylus exsertus, basin versus glandulosus, stigmate viride coronatus. *Fructus* parum obliquus, lignosus, 3·5–4 cm. longus, 1·4 cm. crassus, glanduloso-pilosus.—J. Hutchinson.

This handsome species, *Rhododendron auriculatum*, is a native of Western Hupeh where, as Mr. E. H. Wilson informs us, it occurs scattered throughout woods without being anywhere common. It was first collected by Professor A. Henry, in 1885, near Ichang, and was met with again by him in subsequent years. Wilson obtained it in 1901 near Fang. In its native habitat this is the last of the Rhododendrons to come into flower and, as it maintains this characteristic in cultivation, this fact imparts to *R. auriculatum* its most important feature from the garden point of view. At Kew, where the species is represented by examples acquired from Messrs. J. Veitch and Sons in 1908, it does not commence to

grow until the latter part of July, and it flowers at the same time. It may therefore be possible to found on it a race of hardy hybrids later in flowering than any now in existence, though it is difficult to find other Rhododendrons flowering in July with which it can be crossed. At Kew it has been fertilised with pollen from a belated *R. ponticum*, Linn.; it has also been crossed with the late-flowering form of *R. decorum*, Franch. In the wild state the flowers of *R. auriculatum* vary, so Wilson states, from white to rosy red. They are pleasantly fragrant, their odour recalling that of a freshly cut dessert apple. In foliage it is perhaps the finest of all Rhododendrons hardy in a climate like that of the Thames valley, though in milder districts larger leaves are borne by Himalayan species like *R. Falconeri*, Hook. f., and *R. grande*, Wight. The largest leaves of *R. auriculatum* measured have been thirteen inches long by five inches across. Though quite hardy at Kew, its greater luxuriance in Cornish gardens indicates that it prefers rather milder conditions. It should be grown in thin woodland or in some other position where it is protected from the midday sun.

DESCRIPTION.—*Shrub* or, according to Henry, at times a *tree* 30 ft. high; shoots stout, in the first season densely hirsute with very long glandular hairs, in the following year pustulate with the remains of the hairs, when older, brown and glabrous. *Leaves* oblong or elliptic-oblong, rounded or apiculate at the tip, rounded or more often cordate at the base, 6–10 in. long, 1¾–3 in. wide, in cultivation in the south-west of England sometimes larger, papery, at first pilose on both sides, but more densely so beneath, at length almost glabrous except along the midrib, which is narrow above and very conspicuous beneath, where it is ⅛ in. wide towards the base; lateral nerves spreading, about 18 along each side, slender and strongly reticulate; petiole 1–1½ in. long, glabrous; axillary buds small, ovoid, glabrous, about ¼ in. long. *Inflorescence* terminal, 6–10-flowered, nearly 9 in. across. *Flowers* in the cultivated specimens white, fragrant, densely racemose; pedicels stout, ¾–1¼ in. long, densely clothed with very long glandular hairs. *Calyx* now shortly, now distinctly lobed, the longest lobes over ¼ in. long, hirsute in the back with glandular hairs. *Corolla* funnel-shaped; tube 1¾–2 in. long, sparsely setulose externally; throat 1½ in. across; lobes 7, spreading, broadly ovate-orbicular, about 1¼ in. long. *Stamens* 14, shortly exserted; filaments nearly equal in length, glabrous; anthers brownish-yellow, ⅙ in. long. *Ovary* 7–8-celled, densely beset with glandular hairs; style exserted, glandular towards the base, tipped by the green stigma. *Capsule* rather oblique, woody, 1¼–1½ in. long, over ½ in. wide, glandular-hairy.

TAB. 8786.—Fig. 1, base of a young leaf; 2, calyx and pistil; 3, portion of corolla tube with corresponding lobe; 4, stamen; 5, anther; 6, transverse section of ovary:—*all enlarged except* 3, *which is of natural size.*

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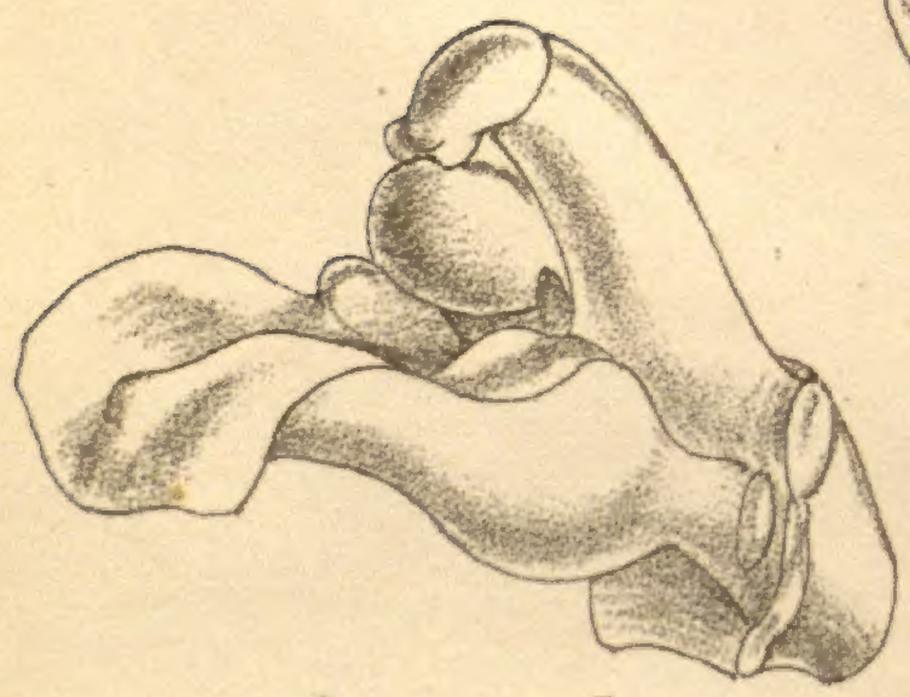

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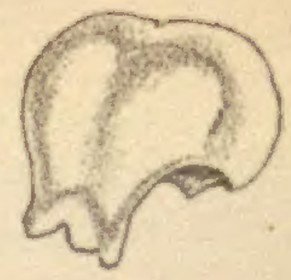

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Tab. 8787.

ISABELIA virginalis.

Brazil.

Orchidaceae. Tribe Epidendreae.

Isabelia, *Rodr. Gen. et Sp. Orch. Nov.* vol. i. p. 75.

Isabelia virginalis, *Rodr. Gen. et Sp. Orch. Nov.* vol. i. p. 76, cum icon. caet. anteposita; *Cogn. in Mart. Fl. Bras.* vol. iii. pars vi. p. 567, t. 105, fig. 2; *Behnick in Orchis*, vol. v. p. 5, t. 1; species unica.

Herba epiphytica, parva, rhizomate repente teretiusculo. *Pseudobulbi* contigui, ovoideo-globosi, 0·5–0·7 cm. longi, vaginis scariosis demum valde fibroso-laciniatis obtecti, apice monophylli. *Folia* teretiuscula, subobtusa, arcuata vel flexuosa, 4–15 cm. longa, circiter 1 mm. lata. *Scapi* breves, graciles, 3–5 mm. longi, uniflori; bracteae spathaceae, obtusae, brevissimae; pedicelli breves. *Flores* patentes, parvi, pallide rosei. *Sepalum* posticum suberectum, ovato-oblongum, obtusum, subconcavum, 4–5 mm. longum; *sepala* lateralia subpatentia, ovato-oblonga, obtusa, 5 mm. longa, basi breviter connata, in mentum brevissimum producta. *Petala* subpatentia, anguste oblonga, obtusa, 4–5 mm. longa, basi subattenuata. *Labellum* inferne suberectum, valde concavum, superne patenti-recurvum, obovatum, convexiusculum, 3–4 mm. latum; discus crassiusculus. *Columna* suberecta, lata, 2·5–3 mm. longa, exalata; pollinia 8, elliptico-oblonga, subcompressa, in quoque loculo 4; caudiculae subfiliformes, arcuatae, apice connatae.—R. A. Rolfe.

The remarkable Brazilian Orchid which forms the subject of our plate was described and figured by Mr. Barbosa Rodriguez in 1877 from specimens growing on trees at Caldas, in the province of Minas Geraes. It had, however, been previously met with by Dr. G. Gardner, for there is a specimen of the same plant in the Lindley Herbarium which Gardner has noted as being a species of *Maxillaria*, collected by him in March, 1837, on the stems of trees in the Organ Mountains. To this specimen Dr. Lindley added the note, "genus uncertain, the only flower was broken and injured by insects." Rodriguez when he described the plant, which he dedicated to H.I.H. Donna Isabel, Comtessa d'Eu, remarked that it is a very bizarre Orchid with almost the habit of a *Maxillaria*, but with a pollinary structure

so different from that of *Maxillaria* that he placed his genus *Isabelia*, with good reason, in the tribe *Epidendreae*, between Lindley's two genera *Leptotes* and *Sophronitis*. In the figure of *I. virginalis* supplied by Rodriguez, which serves as the frontispiece to his volume, the remarkable fibrous sheaths which clothe the pseudobulbs are shown as being more developed than they are in the cultivated plant here depicted. For the introduction of this plant to cultivation, orchid-growers are indebted to Mr. K. Grossman, who sent living plants to the Botanic Garden at Berlin in 1904. The example now figured was received at Kew from the Director of the Berlin Botanic Garden in 1908, and has thriven well in an intermediate temperature attached to a block of tree-fern stem. Under cultivation it flowers very sparingly, the last occasion being December, 1917, when our drawing was prepared. It is by no means conspicuous, even when in flower, for the solitary individual blossoms are small, and are borne on extremely short peduncles; they are whitish with a light flush of rose or pale purple in the sepals. The flowers are, however, extremely interesting on account of their remarkable structure.

Description.—*Herb*, epiphytic, small, with a creeping cylindric rootstock. *Pseudobulbs* 1-foliate, close-set, ovoid-globose, $\frac{1}{5}$–$\frac{1}{3}$ in. long, clothed with scarious sheaths which at length become fibrous-laciniate. *Leaves* nearly cylindric, rather blunt, curved or flexuous, $1\frac{3}{4}$–6 in. long, very narrow. *Scapes* short, slender, $\frac{1}{8}$–$\frac{1}{5}$ in. long, 1-flowered; bracts spathaceous, blunt, very short; pedicels short. *Flowers* small, spreading, flushed with rose or pale purple. *Sepals*: posterior suberect, ovate-oblong, blunt, somewhat concave, $\frac{1}{6}$–$\frac{1}{5}$ in. long; lateral somewhat spreading, ovate-oblong, blunt, $\frac{1}{5}$ in. long, shortly connate at the base and produced into a short mentum. *Petals* somewhat spreading, narrow-oblong, blunt, $\frac{1}{6}$–$\frac{1}{5}$ in. long, somewhat narrowed at the base. *Lip* towards the base very concave and more or less erect, higher up recurved and spreading, obovate, somewhat convex, $\frac{1}{8}$–$\frac{1}{6}$ in. wide; disk somewhat thickened. *Column* nearly erect, broad, $\frac{1}{10}$–$\frac{1}{8}$ in. long, without wings; pollinia 8 (4 in each locule), elliptic-oblong, somewhat compressed; caudicles almost filiform, curved, connate at their tips.

Tab. 8787.—Fig. 1, portion of rhizome with pseudobulbs clothed with their laciniate-fimbriate sheaths; 2, apex of a leaf; 3, flower, seen from one side; 4, the same, seen from in front; 5, lip and column, seen from one side; 6, anther-cap; 7, pollinia, showing the filiform caudicles:—*all enlarged*.

M.S. del. J.N. Fitch lith.

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Tab. 8788.

IPOMOEA dasysperma.

Tropical Asia and Africa.

Convolvulaceae. Tribe Convolvuleae.

Ipomoea, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 870.

Ipomoea dasysperma, *Jacq. Eclog.* vol. i. p. 132, t. 89; *Choisy in Mém. Soc. Phys. Genèv.* vol. vi. p. 472 *et in DC. Prodr.* vol. ix. p. 386; *Hasskarl, Retzia*, pugillus 1, p. 70; *C. B. Clarke in Hook. f. Fl. Brit. Ind.* vol. iv. p. 215; *Hallier f. in Engl. Jahrb.* vol. xviii. p. 148; *Trimen, Handb. Fl. Ceylon*, vol. iii. p. 225; *Boerlage, Handl. Fl. Ned. Ind.* vol. ii. p. 512; *Baker & Wright in Dyer, Fl. Cap.* vol. iv. sect. 2, p. 67, in nota; *Baker & Rendle in Dyer, Fl. Trop. Afr.* vol. iv. sect. 2, p. 179; species *I. palmatae*, Forsk., valde affinis, sed foliis saepissime 7-lobatis, sepalis exterioribus plus minusve saccatis vel calcaratis, limbo corollae stramineo vel sulfureo luteo differt.

Herba ut videtur annua, glaberrima. *Caules* volubiles, usque ad 2 m. alti vel ultra, gracillimi, simplices vel paulum ramosi, interdum tuberculati. *Folia* petiolata, ambitu late cordato-ovata, 3·5–10 cm. longa et lata, trisecta, segmentis primariis basi plus minusve angustatis, segmento terminali tripartito ceteris bi- vel tripartitis, interdum pedata; lobi lanceolati, acuti vel acuminati, integerrimi, 1·5–8 cm. longi, ·5–1·75 cm. lati; petiolus 2–5 cm. longus, interdum in axilla rudimentis foliorum stipulis simulantibus praeditus. *Pedunculi* axillares, 3–4 cm. longi, 1–3 (raro 4)-flori, bracteis minutis paucis instructi. *Sepala* 5, elliptica, apice rotundata, 7–10 mm. longa, 5–6 mm. lata, margine membranacea, exterioria basi 1- vel 2-sacculata vel calcarata. *Corolla* hypocrateriformis, glabra; tubus 2·5–3·5 cm. longus, prope medium 8–10 mm. latus, basi constrictus, pallide (fauce vivide) purpureus; limbus planus, leviter pentagonus, usque ad 7 vel 10 cm. latus, stramineus vel sulfureo-luteus, vittis 5 viridescentibus ornatus. *Stamina* 5; filamenta basi pilosa; antherae oblongae. *Ovarium* subglobosum, glabrum, basi disco crassiusculo angusto circumdatum; stylus filiformis inclusus, staminibus longior, stigmate bilobato. *Capsula* globosa, glabra, circiter 1 cm. diametro, bilocularis. *Semina* in utroque loculo 2, subtrigona, circiter 6 mm. longa lataque, dense villosa, interdum in angulis duobus exterioribus pilis longis instructa.—*I. pedata*, Voigt, Hort. Suburb. Calc. p. 360. *I. tuberculata*, [Ker-Gawl. in] Bot. Reg. t. 86; non Roem. et Schult. *I. odontosepala*, Baker in Kew Bull. 1894, p. 73; Baker & Rendle in Dyer, Fl. Trop. Afr. vol. iv. sect. 2, p. 180. *I. calcarata*, N. E. Brown in Dyer, Fl. Trop. Afr. vol. iv. sect. 2, p. 180, and in Kew Bull. 1909, p. 124. *Convolvulus pedatus*, Roxb. Hort. Beng. p. 14, et Fl. Ind., ed. Carey, vol. i. (1832), p. 478. *C. dasyspermus*, Spreng. Syst. vol. i. p. 591. *Calonyction trichospermum*, var. *diversifolium*, Choisy in DC. Prodr. vol. ix. p. 346. *C. diversifolium*, var. *sulfureum*, E. Morr. in Belg. Hort. 1857, p. 225, cum ic. col.; Van Houtte in Fl. des Serres, sér. 2, vol. iii. p. 67, t. 1328.—S. A. Skan.

This *Ipomoea*, attractive both in foliage and in flowers, the latter being of a colour very unusual in the genus, has long been known in gardens. Its first recorded appearance was in the Calcutta Botanic Garden in 1812, where, according to Roxburgh, it sprang up accidentally amongst plants received from friends in the vicinity of Calcutta; of its native place he was uncertain. Under the name of *I. tuberculata* it was figured and described in the Botanical Register in 1816, and it is there stated that the plant was raised from seeds collected in the Calcutta Botanic Garden, and sent by Sir Evan Nepean, it would appear early in 1815, to Messrs. Whitley, Milne and Brame, Nurserymen of King's Road, Chelsea. Jacquin first met with it in the Vienna University Botanic Garden, where, he informs us, it was obtained amongst several unnamed Chinese seeds received from England in 1814. The species appears to have a wide distribution, but very probably it is not a native in some of the localities from which it is recorded. In India it is known from Simla, Rohilcund and the Deccan Peninsula. It is also known from Ceylon "in dry country, very rare," and from Java. There is no satisfactory evidence that it is native in China and Australia, though these countries are included in its range by various authorities. In Tropical Africa it ranges from Nubia, Abyssinia, the Egyptian Sudan, German East Africa to the Kwebe Hills in Ngamiland, and Upingtonia in South-West Tropical Africa. There is a very small-flowered specimen in the Kew Herbarium labelled, possibly incorrectly, "C.B.S. Villette." The material for the accompanying figure was obtained from a plant raised from seeds received in 1917 from Major Howard of Richmond, and collected by him at Kilimatinde in German East Africa. The flowers vary considerably in size as shown by the plant cultivated at Kew, as well as by the dried specimens, and forms with unusually large flowers have been supposed to represent distinct species and have been described as such. It is possible also that the colour varies, for in one instance the flowers are said to be white. The curious little pouches, sometimes very conspicuous at the base of the outer sepals, appear to differ in size and in some of the dried specimens are

scarcely noticeable. It is almost certain that *I. saccata*, Hallier f. (in Engl. Jahrb. vol. xxviii. p. 48), from German East Africa, of which there is no specimen at Kew, should also be referred to *I. dasysperma*. At Kew the species has been raised and flowered in a tropical house.

Description.—*Herb*, apparently annual, everywhere quite glabrous. *Stems* twining, 6–8 ft. high or more, very slender, simple or sparingly branched, at times tuberculate. *Leaves* petioled, wide cordate-ovate, 1½–4 in. long and broad, 3-sect with the main lobes more or less narrowed at the base, and the central lobe 3-partite while the lateral are 2–3-partite, or at times pedate; lobes lanceolate, acute or acuminate, quite entire, ⅔–3 in. long, ⅕–¾ in. wide; petioles ¾–2 in. long, occasionally with rudimentary leaves resembling stipules in their axils. *Peduncles* axillary, 1¼–1½ in. long, 1–3 (rarely 4)-flowered, with a few minute bracts. *Sepals* 5, elliptic with rounded tips, ⅓–⅖ in. long, ⅕–¼ in. wide, their margins membranous, their bases outside with 1 or 2 small pouches or spurs. *Corolla* salver-shaped, glabrous; tube 1–1⅓ in. long, ⅓–⅖ in. wide about the middle, narrowed at the base, pale purple throughout and deep purple at the throat; limb flattened, somewhat 5-angled, 2¾–4 in. across, from straw-colour to sulphur-yellow, with 5 narrow greenish bands. *Stamens* 5; filaments pilose at the base; anthers oblong. *Ovary* nearly globose, glabrous, encircled at the base by a narrow but stoutish disk; style filiform, included, longer than the stamens; stigma 2-lobed. *Capsule* globose, glabrous, about ⅖ in. across, 2-celled. *Seeds* 2 to each cell, somewhat 3-gonous, about ¼ in. long and broad, densely villous, sometimes fringed with long hairs along the two outer angles.

Tab. 8788.—Fig. 1, calyx; 2, an outer sepal; 3, an inner sepal; 4, base of corolla-tube, laid open and showing the insertion of three of the stamens; 5, pistil:—*all enlarged.*

M.S. del. J.N. Fitch lith.

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Tab. 8789.

RHODODENDRON callimorphum.

Yunnan.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron callimorphum, *Balf. f. et W. W. Sm. in Notes Roy. Bot. Gard. Edinb.* vol. x. p. 89 (1917); affinis *R. Souliei*, Franch., sed foliis infra parce stipitato-glandulosis, calycis lobis minoribus extra dense glandulosis, stylo basin versus parce glanduloso differt.

Frutex usque ad 3 m. altus, laxe foliatus; ramuli suberecti, teretes, annotini inferne brunnei, glabrescentes, superne pallide virides, glandulis sparsis substipitatis brunneis ornati, vetustiores laeves, leviter et minute punctati, circiter 6 mm. crassi. *Folia* pauca, ovata vel ovato-orbicularia, basi aperte cordata, apice rotundata, obtuse mucronata, 3–6·5 cm. longa, 2–4·5 cm. lata, tenuiter coriacea, supra nitida, viridia, glabra, infra glauca, reticulata, costa parce stipitato-glandulosa excepta glabra; costa infra conspicua, plerumque erubescens; nervi laterales utrinsecus 8–9, prope marginem valde ramosi; petioli 1–2 cm. longi, glandulis rubescentibus vel nigrescentibus stipitatis parce obtecti. *Inflorescentia* terminalis, circiter 8-flora; bracteae mox caducae, haud visae; pedicelli patuli, 2–2·5 cm. longi, glandulis globosis rubris breviter stipitatis dense ornati. *Calyx* brevissimus, circiter 1·25 mm. longus, lobis 5 triangularibus extra rubro-glandulosis. *Corolla* roseo-rubra basi dorso macula unica notata, campanulata, 4·5 cm. longa, 5-loba; tubus 3 cm. longus, eglandulosus; lobi alte emarginati, 1·3 cm. longi, 2·5 cm. lati, margine undulati. *Stamina* 10, inaequalia, 5 longiora usque ad 3·5 cm. longa vix exserta, 5 breviora ad 2 cm. longa, inclusa; filamenta roseo-alba, glabra; antherae brunneae, 3 mm. longae. *Ovarium* 5-loculare, glandulis rubris breviter stipitatis dense obtectum; stylus corollam aequans, basin versus parce stipitato-glandulosus, apice pallide flavo-viridis, stigmate disciformi minute 5–6-lobulato coronatus. *Fructus* haud visus.—J. Hutchinson.

The charming *Rhododendron* here figured was first met with by Mr. G. Forrest on the western flank of the Shweli-Salwin divide in south-western Yunnan in August, 1912, at elevations of about 10,000 feet and was found again by the same collector at similar elevations on open rocky slopes in the following June. Described at Edinburgh from specimens of the second gathering, *R. callimorphum* is now in cultivation in various collections in this country and appears to be fairly hardy at Caerhays Castle in Cornwall, whence Mr. J. C. Williams, with whom alone it has yet flowered, supplied the material for our plate; also at the Sunningdale Nurseries

where, as Mr. H. White informs us, it has more than once experienced very severe frost, but has escaped with only slight injury; and at Kew where an example which has lived out of doors for five years is quite healthy. In cultivation it has so far grown into a compact shrub about three feet high, bearing some outward resemblance to *R. campylocarpum*, Hook. f., figured at t. 4968 of this work; its nearest ally, however, is *R. Souliei*, Franch., described at t. 8622. Marked features of *R. callimorphum* are its long petioles covered with red or blackish stalked glands, and its nearly cordate ovate-orbicular leaves with a distinct bloom on the underside. Occasionally one of the uppermost leaves is considerably reduced in size and spathulate in shape, while the petiole is widened and winged. It is not clear that this is a frequent feature in *R. callimorphum*; it arrests attention owing to its rarity in species of *Rhododendron* proper, though it is of common occurrence in the *Azalea* section of the genus. It is perhaps too soon to predict the situation that will best suit *R. callimorphum* and lead to its attaining the dimensions of wild specimens. Those in shady positions are, however, at present growing more freely than those in fairly open spots.

Description.—*Shrub*, in nature reaching 10 ft. in height, laxly leafy; twigs rather straight, cylindric, becoming brown towards the base and nearly glabrous when a year old, pale green upwards, beset with a few brown short-stalked glands, when older smooth, faintly punctate, about $\frac{1}{4}$ in. thick. *Leaves* few, ovate or ovate-orbicular, rather widely cordate, rounded and bluntly mucronate at the tip, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{3}{4}$ in. wide, thinly leathery, green, glabrous and shining above, glaucous beneath, reticulately nerved and glabrous save for some stalked glands on the midrib, which is prominent and usually reddish beneath; lateral nerves about 8–9 along each side, freely branched towards the leaf-edge; petiole $\frac{1}{3}$–$\frac{3}{4}$ in. long, sparsely beset with reddish or blackish stalked glands. *Inflorescence* terminal, about 8-flowered; bracts early caducous, not yet seen; pedicels spreading, $\frac{3}{4}$–1 in. long, densely beset with red short-stalked globular glands. *Calyx* very short, about $\frac{1}{20}$ in. long; lobes 5, triangular, beset outside with red glands. *Corolla* rosy red, with a solitary dark red basal blotch behind, campanulate, $1\frac{3}{4}$ in. long, 5-lobed; tube $1\frac{1}{4}$ in. long, without glands; lobes deeply notched, about $\frac{1}{2}$ in. long, 1 in. across, with undulate margins. *Stamens* 10, unequal, 5 longer, up to $1\frac{1}{2}$ in. long, barely exserted, 5 shorter, $\frac{3}{4}$ in. long, included; filaments white tinged with rose, glabrous; anthers brown, $\frac{1}{8}$ in. long. *Ovary* 5-celled, densely clothed with red short-stalked glands; style as long as the corolla, sparingly beset with stalked glands near the base, pale yellowish-green upwards; stigma flattened, minutely 5–6-lobulate. *Fruit* not seen.

Tab. 8789.—Fig. 1, apex of leaf; 2, calyx and pistil; 3, calyx and ovary; 4 and 5, stamens; 6, transverse section of ovary:—*all enlarged.*

M & del. W. Fitch. lith

Vincent Brooks, Day & Son Lit^d imp.

L. Reeve & C^o London.

Tab. 8790.

ALOE concinna.

Zanzibar.

Liliaceae. Tribe Aloineae.

Aloe, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 776.

Aloe (§ Monostachyae) **concinna**, *Baker in Dyer, Fl. Trop. Afr.* vol. vii. p. 461; *Berger in Engl. Pflanzenr.—Liliac. Asphodel.-Aloin.* p. 265, fig. 103, A–C; species *A. Dorotheae*, Berger, affinis, perianthio breviore differt.

Suffrutex caulescens, 20–32 cm. alta. *Caulis* erectus vel adscendens, inferne nudus, cicatricibus foliorum delapsorum annulatus, 1 cm. diametro, supra foliatus, 1·3 cm. diametro. *Folia* quaquaversa, late lanceolata, ad apicem acutum gradatim acuminata, parte inferiore biconvexa, 1 cm. crassa, parte tertia superiore concavo-convexa, reflexa, dentibus approximatis deltoideis curvatis albis 4 mm. longis praedita, viridia, utraque maculis ovalibus pallidioribis notata. *Pedunculus* simplex, inclinatus, 12 cm. longus; pedicelli vix 1 cm. longi; bracteae lanceolatae, scariosae, quam pedicelli breviores; racemus 6 cm. longus. *Perianthium* cylindricum, 2–4 cm. longum, 7 mm. diametro, basi rubrum, medio flavum, apice viride; tubus brevis; lobi oblongi, obtusi. *Filamenta* perianthio aequilonga; antherae exsertae. *Ovarium* oblongum, leviter 3-lobum; stylus perianthio aequilongus.—C. H. Wright.

The *Aloe* now figured was first discovered at Zanzibar by Sir John Kirk by whom it was presented to Kew. It has grown satisfactorily in a sunny tropical house where it flowers in the autumn and suckers rather freely. The original plant flowered at Kew for the first time not in autumn but in April, 1895, and when it was then described by Mr. Baker it still had "laxly rosulate" leaves, but by 1901 it had developed a stem thirteen inches high with scattered foliage. From the suckers several independent plants have been raised and one of these, which forms the subject of our plate, flowered at Kew in October, 1916. One of the plants had by October, 1918, developed two stems, eleven and thirteen inches high respectively, with five basal offsets from one to two inches in height. The stem is relatively slender, and the naked portion is conspicuous on account of the

gradual increase in thickness from the base upwards. Though erect or at least ascending in these cultivated plants, the appearance of the stem suggests that in wild ones it may be more or less prostrate, a suggestion strengthened by the inclined position assumed by the inflorescence. The leaves, which are remarkable for their closely set silvery white spots, are relatively small for the genus; their sheaths are rather long and completely encircle the stem. It is singular that since its original discovery this species has not again been met with in a wild state. In the division of the section to which *A. concinna* belongs are included two other Aloes, both nearly related to our plant, yet both readily distinguished from it by their flowers, for one of them, *A. squarrosa*, Baker, a Socotran species, has a shorter perianth, while the other, *A. Dorotheae*, Berger, a species of German East Africa, has a longer perianth than *A. concinna*.

Description.—*Undershrub* with a distinct stem, 8–13 in. high, and succulent leaves. *Stem* erect or ascending, naked at the base where it is marked by the annular scars of the fallen leaves, and is about $\frac{1}{3}$ in. thick, leafy upwards, and there over $\frac{1}{2}$ in. thick. *Leaves* scattered, wide-lanceolate, gradually narrowed to the acute tip, biconvex towards the base, and about $\frac{1}{3}$ in. thick, in the upper third concave above and convex below, reflexed and beset along the margin with rather close-set, curved, deltoid, white teeth about $\frac{1}{6}$ in. long, green and marked on both sides with silvery oval spots. *Peduncle* unbranched, slender, inclined to one side, 4–5 in. long; pedicels about $\frac{1}{3}$ in. long; bracts lanceolate, scarious, shorter than the pedicels; raceme 3 in. long. *Perianth* cylindric, $\frac{3}{4}$–$1\frac{1}{2}$ in. long, about $\frac{1}{4}$ in. across, reddish at the base, yellow towards the middle, green near the apex; tube short; lobes oblong, blunt. *Filaments* as long as the perianth; anthers just overtopping the perianth-lobes. *Ovary* oblong, slightly 3-lobed; style as long as the perianth.

Tab. 8790.—Fig. 1, a flower; 2 and 3, stamens; 4, pistil; 5, sketch of the entire plant:—*all enlarged except* 5, *which is much reduced.*

M.S. del. J.N. Fitch, lith

Vincent Brooks Day & Son Ltd imp

L. Reeve & Co London.

Tab. 8791.

PRIMULA chasmophila.

Bhutan.

Primulaceae. Tribe Primuleae.

Primula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 631.

Primula (§ Soldanelloides) **chasmophila**, *Balf. f.*; affinis *P. spicatae*, Franch., et *P. Wattii*, King; ab illa foliis basi abrupte et brevissime cuneatis longe petiolatis, ab hac foliis multo minoribus, ab ambalus inflorescentiis 3-floris differt.

Herba usque ad 8 cm. alta. *Folia* radicalia, petiolata, leviter bullata, oblongo-lanceolata, basi brevissime cuneata, 2·5–3 cm. longa, 1·2–1·5 cm. lata, pinnatilobulata, chartacea, viridia, lobulis late ovatis 1–2-dentatis circiter 2·5 mm. longis, utrinque praecipue infra in nervis puberula; costa infra valde prominens, purpurascens, puberula; nervi laterales circiter 7, infra prominentes; petioli 1·5–2 cm. longi, purpurei, puberuli. *Flores* in capitulum reflexi, sessiles, saepe 3-nati; pedunculi 6–7 cm. longi, 2 mm. crassi, minute puberuli; bracteae calycinae, inaequales, plus minusve ovatae, usque ad 4 mm. longae. *Calyx* campanulatus, 6 mm. longus, ad medium irregulariter 5-lobus lobis interdum apice 2–4-dentatis, extra minutissime puberulus, viridis et saepe purpureus. *Corolla* intense violacea, odorata; tubus infundibuliformis, 1·5 cm. longus, extra puberulus; limbus 2 cm. expansus, profunde 5-lobus, lobis conspicue emarginatis emucronatis. *Antherae* 1·5 mm. longae, infra tubi medium insertae. *Ovarium* subglobosum; stylus gracilis, stigmate capitato-discoideo coronatus.—J. Hutchinson.

The material on which our figure of the pleasing *Primula* now described has been based was received from Sir F. W. Moore, by whom it had been grown at the Royal Botanic Garden, Glasnevin, under the name *P. chasmophila*, Balf. f., in April, 1918. It is a native of Bhutan, where it was obtained by Mr. Cooper when collecting on behalf of Mr. A. K. Bulley, Neston, Cheshire, through whom the plant figured had reached Glasnevin. Professor Balfour, to whom the plant owes its name, has kindly informed us that Mr. Cooper's original material was all in fruit, and that although the plant flowered in the Royal Botanic Garden, Edinburgh, in 1917 the blossoms were mostly so imperfect as to render it desirable to defer the preparation of a full

description. In Bhutan the species is met with in dry sunny positions in rocky soil at about 16,000 feet above sea-level. *P. chasmophila* is a member of the *Soldanelloides* section of the genus, whereof there are several species in the eastern Himalaya and Western China, most of them characterised by their diminutive size and relatively small leaves associated with large and conspicuous flowers, though usually they enlarge considerably after flowering. Perhaps the extreme of this condition is met with in *P. uniflora*, Klatt, a Sikkim species in which the leaves are remarkably small while there is but a single large flower. The nearest allies of *P. chasmophila* are the Chinese *P. spicata*, Franch., and the Himalayan *P. Wattii*, King.

Description.—*Herb*, about 3 in. high. *Leaves* all radical, stalked, slightly bullate, oblong-lanceolate, base shortly cuneate, 1–1¼ in. long, ½–⅔ in. wide, pinnately lobulate, thin, green, the lobules wide-ovate, 1–2-toothed, about 1/10 in. long, puberulous on both surfaces, but especially beneath; midrib much raised beneath, purplish, puberulous; lateral nerves about 7 along each side the midrib, raised beneath; petiole ½–¾ in. long, purple, puberulous. *Flowers* clustered, reflexed, sessile, often 3 together; peduncle 2½–3 in. long, 1/12 in. thick, finely puberulous; bracts calycine, unequal, more or less ovate, the largest ⅙ in. long. *Calyx* campanulate, ¼ in. long, irregularly 5-lobed, the lobes sometimes 2–4-toothed at the tip, very finely puberulous externally, green and often suffused with purple. *Corolla* deep violet, fragrant; tube funnel-shaped, ⅔ in. long, puberulous outside; limb ¾ in. across, deeply 5-lobed; lobes very distinctly emarginate. *Anthers* 1/16 in. long, inserted below the middle of the tube. *Ovary* subglobose; style slender, tipped by the discoid-capitate stigma.

Tab. 8791.—Fig. 1, calyx and pistil; 2, calyx, in section, showing ovary and style; 3, corolla, in section; 4 and 5, anthers:—*all enlarged.*

M.S. del. J.N. Fitch lith

Vincent Brooks, Day & Son Lt^d imp

L. Reeve & C^o London

Tab. 8792.

BULBOPHYLLUM robustum.

Madagascar.

Orchidaceae. Tribe Epidendreae.

Bulbophyllum, *Thouars; Benth. et Hook. f. Gen. Plant.* vol. iii. p. 501.

Bulbophyllum robustum, *Rolfe in Bot. Mag.* sub t. 8000, sine descriptione; *Kew Bull.* 1918, p. 234; affine *B. crenulato*, Rolfe, sed habitu robustiore, sepalis lateralibus angustioribus et ovarii carinis integris differt.

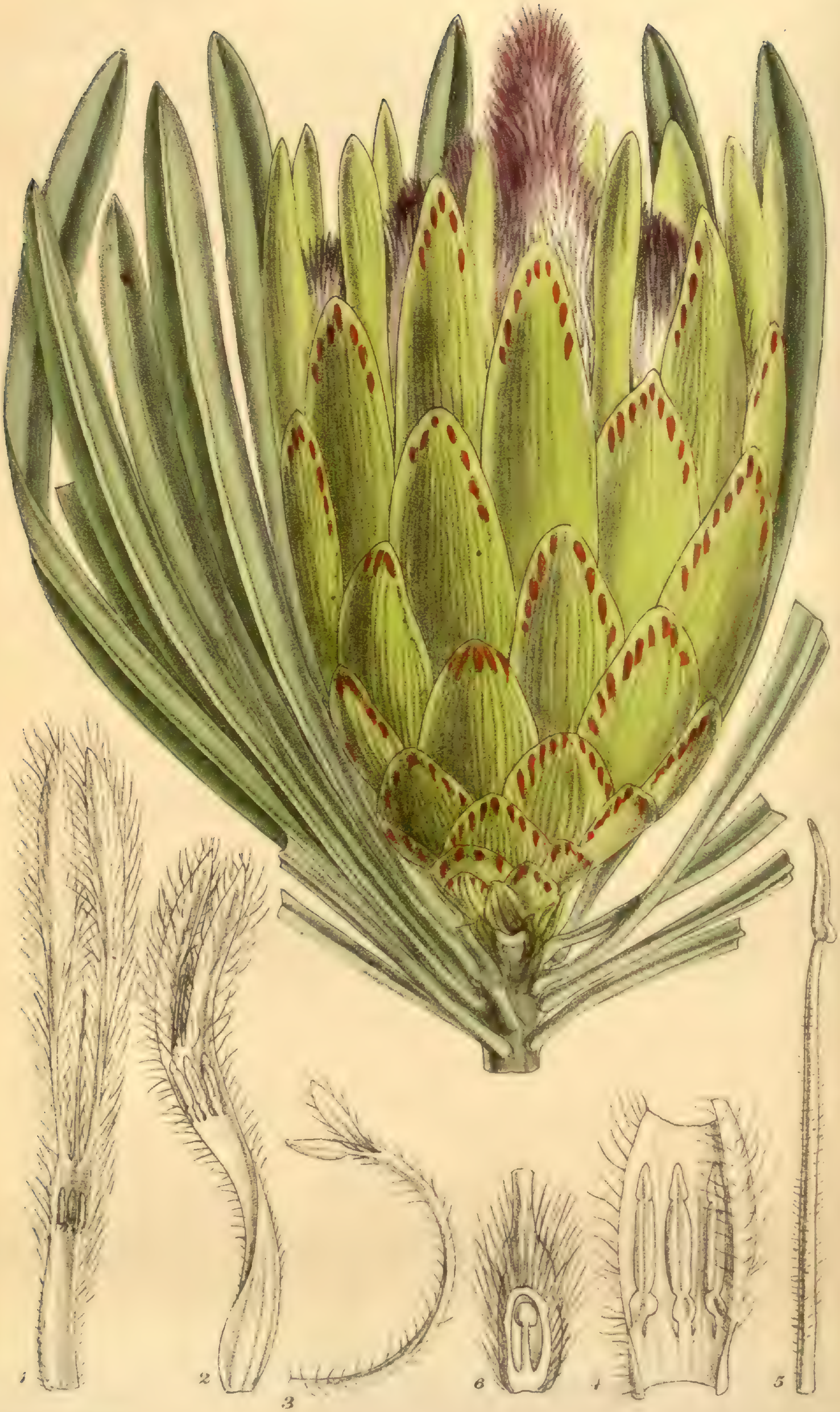
Herba epiphytica. *Rhizoma* repens, validum, vaginis ovatis ancipitibus acutis imbricatis obtecta. *Pseudobulbi* tetragoni, acutanguli, oblongi, 4–6 cm. longi, 1·5–2 cm. lati, diphylli. *Folia* elliptico-oblonga, subobtusa, coriacea, 12–22 cm. longa, 2–3 cm. lata. *Scapi* suberecti, 15–25 cm. longi, vaginis tubuloso-spathaceis obtecti; spica patens vel recurva, oblonga, crassa, densiflora, 6–8 cm. longa, circiter 1·5 cm. lata; rhachis alveolata; bracteae late ovatae, subobtusae, 3 mm. longae; pedicelli crassissimi, 3 mm. longi. *Flores* parvi, carnosi, 4–5 mm. longi. *Sepalum* posticum inflexum, ellipticum, obtusum, *sepala* lateralia connata; limbus late ovatus, obtusus, papillosus, margine crenulatus. *Petala* triangulari-linearia, obtusa, hyalina, 1·5 mm. longa. *Labellum* orbiculare emarginatum, crassum, 2·5 mm. latum, basi subcordatum. *Columna* brevissima; alae subulato-oblongae, subacutae, 0·5 mm. longae.—R. A. Rolfe.

The name *Bulbophyllum robustum* was originally used to designate a species based on specimens preserved in the herbarium at Kew which had been collected by the Rev. R. Baron in the Central District of Madagascar. In 1914, a living plant of a Madagascar *Bulbophyllum* was presented to Kew by Sir F. W. Moore, Royal Botanic Garden, Glasnevin, and on flowering proved to be identical with the species discovered by Mr. Baron more than twenty years earlier. The species belongs to a somewhat small group of *Bulbophylla* in which the rachis of the inflorescence is clavately thickened. The shortly pedicelled individual flowers are tightly adpressed to the rachis, and are considerably dilated laterally, while the fleshy lip is immersed in a cavity formed by the united lateral sepals, the margins of these being denticulate. The nearest ally of *B. robustum* is *B. crenulatum*, Rolfe, another Madagascar species, figured at t. 8000 of this

work. Our plant differs from *B. crenulatum* in its stouter habit, its larger flowers and in the entire in place of denticulate angles of the ovary. The plant is grown in a basket suspended from the roof of a tropical house at Kew, and thrives well under the treatment suitable for other tropical species of the genus. It flowered at Kew in May, 1917, when the figure now published was prepared.

DESCRIPTION.—*Herb*, epiphytic; rhizome creeping, stout, tightly clothed with ovate acute imbricate sheaths. *Pseudobulbs* sharply 4-angled, oblong, $1\frac{1}{2}$–$2\frac{1}{2}$ in. long, $\frac{2}{3}$–$\frac{3}{4}$ in. wide, 2-foliate. *Leaves* elliptic-oblong, rather blunt, leathery, $4\frac{3}{4}$–$8\frac{1}{2}$ in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide. *Scapes* nearly erect, 6–10 in. long, clothed with tubular-spathaceous sheaths; flowering portion spreading or recurved, oblong, thick, dense-flowered, $2\frac{1}{2}$–$3\frac{1}{4}$ in. long, about $\frac{2}{3}$ in. wide; rachis alveolate; bracts wide-ovate, rather blunt, $\frac{1}{8}$ in. long; pedicels $\frac{1}{8}$ in. long, very thick. *Flowers* small, fleshy, $\frac{1}{6}$–$\frac{1}{5}$ in. long. *Sepals*: posterior inflexed, elliptic, blunt; lateral connate; their limb wide-ovate, blunt, papillose, with margin crenulate. *Petals* triangular-linear, blunt, hyaline, $\frac{1}{16}$ in. long. *Lip* orbicular, emarginate, thick, $\frac{1}{10}$ in. wide, subcordate at the base. *Column* very short, with subulate-oblong, rather acute minute wings.

TAB. 8792.—Fig. 1, a flower; 2, the same, after removal of the petals; 3, petals and lip; 4, pollinia:—*all enlarged.*



M.S del. J.N Fitch. lith

Vincent Brooks Day & Son Lt^d imp.

Tab. 8793.

PROTEA longifolia.

South Africa.

Proteaceae. Tribe Proteae.

Protea, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 169.

Protea longifolia, *Andr. Bot. Rep.* t. 132; *R. Br. in Trans. Linn. Soc.* vol. x. p. 83, partim; *Meisn. in DC. Prodr.* vol. xiv. p. 238, partim; *Phillips & Stapf in Dyer, Fl. Cap.* vol. v. sect. i. p. 574; inter species gregis *Ligulatarum* foliis angustis et perianthii aristis longissimis distincta.

Frutex 1 m. vel paulo ultra 2 m. altus, ramis minute tomentellis vel glabrescentibus. *Folia* anguste loricata, obtusa vel subacuta, basi longe attenuata, 7–17 cm. longa, 6–10 mm. lata, supra pennivenia, glabra. *Capitula* sessilia, 10–15 cm. longa, circiter 10 cm. diametro, bracteis involucri 9–10-seriatis glabris, exterioribus ovatis vel oblongo-ovatis obtusis viridibus apice saepe nigro-maculatis, interioribus lamina lanceolata sensim in unguem abeunte flores aequante vel iis breviore. *Perianthii* vagina 5 cm. longa, basi dilatata et 3-carinata, pubescens nisi inferne demum glabrata; labium paulo ultra 5·5 cm. longum, dorso excepto villosulum vel albo-villosulum, 3-partitum (3-aristatum), segmentis (aristis) lateralibus ad 3 cm. longis linearibus longe villosis pilis inferioribus albidis superioribus atro-purpureis vel nigris, segmento medio (arista media) 8 mm. longo, tenuiter filiformi sursum nigro-piloso. *Stamina* fertilia 3, filamentis 1 mm. longis, antheris linearibus 7 mm. longis apice glandulis ovato-lanceolatis breviter acute acuminatis munitis; stamen sterile filamento filiformi, anthera lineari eglandulosa. *Ovarium* 5 mm. longum, dense rufo-tomentosum; stylus 5 cm. longus, pubescens, teres nisi basi subcompressus et ibi ventro tumidus; stigma 5–6 mm. longum, obtusum, bene geniculatum et curvatum.—*P. coronata*, Lam. Ill. vol. i. p. 236, pro parte. *P. dodoneaefolia*, Buek ex Meisn. l.c. p. 239 (?). *P. vidua*, Gawl. Recens. p. 39. *Erodendrum longipenne*, Knight, Post. p. 35, *Lepidocarpodendron foliis angustis*, etc., Boerh. Ind. Pl. Hort. Ludg. Bat. vol. ii. p. 186, t. 186.—O. Stapf.

Protea longifolia, the subject of our plate, has had a long cultural history. It was first mentioned by Boerhaave in 1720. The specimens on which his account was based came from the mountains of Hottentot's Holland, on the boundary of the Stellenbosch and Caledon divisions of Cape Colony. The field-notes at his disposal enabled him to state that there it is rare, grows on mountain-slopes, has wide-spreading roots, a trunk about as thick as one's arm, which branches about

eighteen inches above the soil-level and attains a height, with the branches, of some three feet. Burchell, who collected it nearly a century later in the Donderhoek Mountains near Villersdorp in northern Caledon, found it to be there very common, reaching a height of five to seven feet and resembling closely *P. mellifera*, Thunb., a native of the Coast Region of South Africa. The area occupied by *P. longifolia* covers practically the whole of the Caledon division and, if we include the form with smaller leaves and heads, which Mr. Phillips separates as var. *minor*, the species extends into the adjoining portion of the Bredasdorp division. Whether it were introduced in the time of Boerhaave or not, we know that towards the close of the XVIII. Century it was raised at Schönbrunn, from seeds sent or brought there probably by the Austrian collector Scholl. Messrs. Lee and Kennedy, of Hammersmith, received from Schönbrunn a plant or plants which flowered in their nursery early in 1801, and were figured by Andrews as *P. longifolia nigra* in the "Repository." But the same firm seem to have obtained, also from Schönbrunn, other specimens which likewise flowered in 1801 and were figured by Andrews as *P. longifolia ferruginoso-purpurea*. About the same time Hibbert had yet another specimen, likewise sent from Schönbrunn, which Andrews described and figured as *P. longifolia*, var. *cono turbinato*. But while Andrews was satisfied that all three were forms or varieties of *P. longifolia*, Sweet regarded them as distinct species which he named *P. longifolia*, *P. ligulaefolia* and *P. umbonalis* respectively. A fourth figure purporting to represent *P. longifolia* was published in the "Botanical Register" in 1815. The plant in this case was again one belonging to Messrs. Lee and Kennedy; this time, however, it was one introduced by Masson in 1790. Sweet accepted Masson's plant as true *P. longifolia*, but Phillips, relying on certain differences exhibited in t. 47 of the "Register," has treated it as the basis of a distinct species, *P. ignota*. In the "Flora Capensis" *P. ligulaefolia* and *P. umbonalis* are similarly recognised. As no specimens of *P. ignota*, *ligulaefolia* or *umbonalis* appear to have been preserved when their respective plates were published, this course is possibly safer than

the alternative one of including all three under *P. longifolia*. But while there is no conclusive evidence to justify the reduction of the three species proposed or accepted by Sweet and Phillips, it has to be remarked that the appearance of the flower-heads in the plant now figured suggests that these heads do not develop perfectly and normally in our relatively sunless climate. This in turn raises the question whether those differences in the shape of the centre of the head, the length of the perianth-arms, and the colouring of the involucral bracts on which the separation of *P. ignota*, *P. ligulaefolia* and *P. umbonalis* from *P. longifolia* depends, may not be fully explained by the adverse conditions with which any *Protea* has to contend when grown in this country. The plant now figured was raised at Kew from seed collected in the Caledon division by Miss M. Mason, to whom the establishment is indebted for many interesting South African plants. The seed was despatched from the Cape in March, 1911; the plant depicted was cultivated in a pot in a greenhouse where it has thriven well, and where it flowered for the first time, at an unexpectedly early age, in October, 1916.

Description.—*Shrub*, 3–7 ft. high, with finely tomentellous or almost glabrous branches. *Leaves* narrow thong-shaped, blunt or somewhat acute, gradually narrowed to the base, 3–7 in. long, $\frac{1}{4}$–$\frac{2}{5}$ in. wide, glabrous, nerves pennate, visible only above. *Flower-heads* sessile, 4–6 in. long, about 4 in. across; involucral bracts 9–10-seriate, glabrous, the outermost ovate or ovate-oblong, obtuse, green, with often dark apical spots, the inner with a lanceolate blade passing gradually into a claw and approaching or equalling the length of the flowers. *Perianth* with a sheath 2 in. in length, dilated and 3-keeled at the base, at first pubescent below, but ultimately glabrous; lip rather more than 2 in. long, somewhat villous with usually white hairs except on the back, 3-partite (3-aristate) with the lateral segments linear, about $1\frac{1}{4}$ in. long, beset with long hairs whitish below, dark purple or black above; the central segment $\frac{1}{3}$ in. long, finely filiform, beset upwards with black hairs. *Stamens* 3 fertile, their filaments very short; anthers linear, over $\frac{1}{4}$ in. long, with shortly sharply acuminate ovate-lanceolate glands at the tip; sterile stamen with a filiform filament and a linear glandless anther. *Ovary* $\frac{1}{5}$ in. long, densely rusty-tomentose; style 2 in. long, pubescent, terete save at the somewhat compressed base which is swollen on the ventral face; stigma $\frac{1}{5}$–$\frac{1}{4}$ in. long, blunt, distinctly kneed and curved.

Tab. 8793.—Fig. 1, upper lip of perianth with long segments; 2, upper lip of perianth with short segments; 3, anterior perianth-segment; 4, fertile stamens; 5, style; 6, ovary in longitudinal section:—*all enlarged*.

M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son Lt^d imp

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Tab. 8794.

GOVENIA LAGENOPHORA.

Mexico.

Orchidaceae. Tribe Vandeae.

Govenia, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 542.

Govenia lagenophora, *Lindl. in Bot. Reg.* 1839, Misc. p. 46: 1845, sub t. 67 (excl. syn.); *Benth. Pl. Hartw.* p. 53; *Rolfe in Orch. Rev.* 1906, p. 316; species *G. utriculatae*, Lindl., affinis, segmentis florum obtusioribus eorumque colore valde differt.

Herba terrestris. *Pseudobulbi* ovoidei, 5–6 cm. longi, vaginis membranaceis obtecti. *Folia* 2, petiolata; limbus ellipticus vel elliptico-lanceolatus, breviter acuminatus, plicatus, 20–50 cm. longus, 7–11 cm. latus, basi attenuatus; petiolus in utriculam lageniformem 15–20 cm. longam 2 cm. latam dilatatus, vaginis tubulosis acutis imbricatis obtectus. *Scapi* axillares, erecti, 50–60 cm. alti; racemi elongati, multiflori, 14–25 cm. longi. *Bracteae* lanceolatae, acutae, 1–1·5 cm. longae. *Pedicelli* subgraciles, 2–2·5 cm. longi, purpurei. *Flores* mediocres. *Sepala* 1·2–1·4 cm. longa, flava; posticum suberectum, elliptico-oblongum, obtusum; lateralia patentia, falcato-oblonga, obtusa. *Petala* suberecta, elliptica, obtusa, 1–1·2 cm. longa, rubro-brunnea. *Labellum* basi erectum, apice recurvum late ellipticum, obtusum, circiter 1 cm. longum, flavum, apice puncto brunneo ornatum. *Columna* incurva, angulata, circiter 1 cm. longa, alis rotundatis brevissimis; pollinia 4, obovoidea, subcompressa; stipes oblongus; glandula orbicularis.—R. A. Rolfe.

It is now nearly eighty years since the Mexican Orchid here figured was first described by Professor Lindley. The original plant flowered in the collection of Mr. John Rogers, junior, Vine Lodge, Sevenoaks, who had imported the bulb. Mr. Rogers, who called Professor Lindley's attention to the character of the leaf-sheaths, remarked that the innermost one, which surmounts the bulb, is entire, and resembles a Florence flask in shape, being about eight inches high, and two to three inches in diameter at the base, but only three-quarters of an inch wide at the throat, translucent or semi-transparent and containing about a third of a pint of water. The pitcher is generally full, all the rain and dew on the leaves being conducted into it; this water appears to be absorbed by

the plant because if not replenished it disappears more rapidly than evaporation would account for. Lindley at a later date reduced his *Govenia lagenophora* to his *G. utriculata*, a West Indian species, first described by Swartz as *Cymbidium utriculatum*, but it is now known that the Mexican and the West Indian plants are very distinct and easily discriminated by the features mentioned by Mr. Rolfe. The original specimen of *G. lagenophora* does not seem to have been preserved, but the letter from Mr. Rogers, accompanied by a sketch, is in the Lindley herbarium, and at a still later date Professor Lindley identified dried specimens collected by Hartweg on the Monte de la Virgin as being identical with Mr. Rogers' plant. Since then the species seems to have remained unknown until, in September. 1907, Mr. Juan Balme, of Hijo, Mexico, sent a sketch of an orchid, collected in the State of Vera Cruz, along with a living bulb. The latter produced flowers in the Kew collection in 1908, and at last enabled the confusion between *G. lagenophora* and *G. utriculata* to be settled. Mr. Balme's plant has been grown in a warm house, and is given an abundant supply of water except when the leaves die down. Under this treatment it has flowered on several occasions since 1908; our drawing was prepared when it did so in November, 1916. At the time of flowering the characteristic utricle does not appear to be fully developed.

DESCRIPTION.—*Herb*, terrestrial. *Pseudobulbs* ovoid, 2–2¼ in. long, clothed with membranous sheaths. *Leaves* 2, stalked; blade elliptic or elliptic-lanceolate, shortly acuminate, plicate, 8–12 in. long, 3–4¼ in. wide, narrowed to the base; petiole dilated into a flask-shaped utricle, 6–8 in. long, about 1 in. wide, clothed outside with acute tubular sheaths. *Scapes* axillary, erect, 1½–2 ft. long, racemes elongated, many-flowered, 6–10 in. long; bracts lanceolate, acute, about ½ in. long; pedicels rather slender, ⅔–1 in. long, purple. *Flowers* medium-sized. *Sepals* about ½ in. long or rather longer, yellow; posterior almost erect, elliptic-oblong, obtuse; lateral spreading, falcate-oblong, obtuse. *Petals* nearly erect, elliptic, obtuse, ½ in. long or rather shorter, reddish-brown. *Lip* erect at the base, recurved, wide-elliptic and obtuse at the apex, about ⅖ in. long, yellow with a brown apical spot. *Column* incurved, angular, about ⅖ in. long; wings very short, rounded; pollinia 4, obovoid, somewhat compressed; stipe oblong; gland orbicular.

TAB. 8794.—Fig. 1, lip and column; 2, column; 3, pollinarium; 4, sketch of the entire plant:—*all enlarged except* 4, *which is much reduced.*

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Tab. 8795.

DEUTZIA compacta.

China.

Saxifragaceae. Tribe Hydrangeae.

Deutzia, *Thunb.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 642.

Deutzia compacta, *Craib in Kew Bull.* 1913, p. 264; *Bean in Trees and Shrubs Brit. Isles*, vol. i. p. 481; species a *D. rubente*, Rehder, inflorescentia compacta multiflora, floribus minoribus distinguenda.

Frutex dumosus, 1–2-metralis; novelli teretes dense stellato-pubescentes; cortex annotinus brunnescens desquamatus. *Folia* oblongo-lanceolata, acuminata, basi rotundata, ramulorum sterilium 7·5 cm. longa, 3 cm. lata, ramulorum floriferorum 2–3·5 cm. longa; nervi laterales conspicui, 5–9-jugi, supra impressi, subtus elevati; supra saturate viridia, parce stellato-pubescentia, subtus pallidiora, pilis stellatis minutis 5–8-radiatis densius obsita; petiolus 2–4 mm. longus, supra canaliculatus. *Corymbi* in ramulos foliatos terminales, rotundati, compacti, pluriflori, ad 5 cm. lati; pedunculi et pedicelli furfuracei. *Flores* 6–9 mm. lati; receptaculum campanulatum, 1·5 mm. longum, squamis stellatis minutis obsitum. *Sepala* 5, 1·5 mm. longa, acuta, ciliolata et adpresse stellato-lepidota. *Petala* imbricata, orbicularia, 3 mm. lata, primo roseo suffusa, mox alba. *Stamina* 10, 2-seriata, petalis breviora; filamenta alba, alata, exteriorum alis apice acutato divergentibus, interiorum breviorum alis apice rotundatis; antherae primo rubescentes demum brunneae. *Styli* 3, glabri. *Fructus* haud visus.—W. J. Bean.

Deutzia compacta was sent to Kew by the late Mr. Maurice L. de Vilmorin in 1912, under the number 4377. It was received with a batch of Chinese plants, but with no precise information as to the particular district in China from which it had been introduced, or by whom its introduction had been effected. It flowered at Kew in July, 1913, when the accompanying figure was prepared. At the same time flowering specimens were received from Glasnevin, gathered from a plant which had been presented to that establishment by Mr. de Vilmorin also. The Kew plant is now about 4 ft. high, bushy, and evidently very hardy. It is about the latest of the Deutzias to open its flowers, and this not only adds to its value as blossoming at a season when shrubs in flower

are becoming scarce, but also enables it to escape the late frosts which, at Kew at any rate, almost every year ruin the display of most of the species. Its flowers are pretty and distinct in their compact arrangement, their small size and large numbers, characters which distinguish it from *D. rubens*, Rehder. The Deutzias enjoy a good loamy soil and abundant sunshine, and are easily increased by means of cuttings put in in July.

DISTRIBUTION.—*Shrub*, probably 5–6 feet high, of bushy habit; young shoots terete, furnished densely with stellate pubescence; bark becoming dark brown and peeling the second season. *Leaves* oblong-lanceolate, acuminate, rounded at the base, finely serrate, those of the barren shoots 3 in. long, $1\frac{1}{4}$ in. wide, those of the flowering twigs $\frac{3}{4}$–$1\frac{1}{2}$ in. long; conspicuously nerved, the chief lateral nerves 5–9 along each side the midrib, impressed above, prominently raised beneath; dull dark green above with scattered stellate hairs, paler beneath and almost covered with minute, 5–8-rayed stellate hairs; petiole $\frac{1}{12}$–$\frac{1}{6}$ in. long, grooved on the upper side. *Corymbs* terminal on short leafy twigs, rounded, compact, many-flowered, about 2 in. across. *Flowers* $\frac{1}{4}$–$\frac{3}{8}$ in. wide; peduncle and pedicels scurfy. *Receptacle* campanulate, $\frac{1}{16}$ in. long. *Sepals* $\frac{1}{16}$ in. long, ciliolate, acute, clothed like the receptacle with minute adpressed stellate scales. *Petals* imbricate, orbicular, $\frac{1}{8}$ in. in diameter, white tinged with pink when young. *Stamens* 10, 2-seriate, shorter than the petals; the filaments white, those of the outer row diverging at the top into a pointed wing at each side of the anthers, those of the inner row shorter; anthers at first red, then brown. *Styles* 3, glabrous. *Fruit* nor seen.

TAB. 8795.—Fig. 1, flower with petals removed; 2, stellate hairs from receptacle; 3, stamen of outer series, seen from in front; 4, the same, seen from behind; 5, stamen of inner series:—*all enlarged.*

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Tab. 8796.

PRIMULA tibetica.

Eastern Himalaya and Tibet.

Primulaceae. Tribe Primuleae.

Primula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 631.

Primula tibetica, *Watt in Journ. Linn. Soc.* vol. xx. p. 6, t. 11a (1882); *Hook. f. Fl. Brit. Ind.* vol. iii. p. 488 (1882); *Pax et Knuth in Engl. Pflanzenr.—Primul.* p. 78 (1905); affinis *P. sibiricae*, Jacq., sed pedunculis brevioribus pedicellis longioribus et calycis lobis marginibus eglandulosis differt.

Herba usque ad 15 cm. alta, radicibus numerosissimis gracilibus fibrosis pallide stramineis. *Folia* radicalia numerosa, longe petiolata, ovato-spatulata, apice rotundata, lamina 1–1·5 cm. longa, 0·8–1 cm. lata, chartacea, utrinque glabra, pallide viridia, nervis lateralibus circiter 3–4; petiolus 1–2·5 cm. longus, 1 mm. latus, glaber. *Scapi* 1–6, efoliati, 2–5-flori, glabri; pedunculi usque ad 7 cm. longi, graciles; pedicelli erecti, gracillimi, usque ad 6 cm. longi; bracteae 3–5, oblongo-lanceolatae, subacutae, foliaceae, 6–10 mm. longae, basi conspicue gibbosae. *Calyx* anguste campanulatus, 4 mm. longus, corollae tubo vix aequilongus; tubus 2·5 mm. longus, glaber; lobi ovato-lanceolati subobtusi dorso viridi-lineati. *Corolla* pallide purpureo-rosea, oculo flavo notata; tubus 6 mm. longus, cylindricus, striatus; lobi profunde emarginati, in limbum 1·5 cm. diametro expansi. *Stamina* supra medium tubum corollae insertae. *Stylus* glaber; stigma paullo exsertum. *Capsula* 1·5 cm. longa, straminea, rigide membranacea, apice lobis 5 dehiscens.—J. Hutchinson.

The charming little *Primula* here figured was raised at Kew from seeds collected by Mr. R. E. Cooper in Bhutan in the Eastern Himalaya for Messrs. Bees, Limited, by whom their supply was shared with this establishment in 1915. The species, which was for the first time described as *P. tibetica* by Sir George Watt in 1882, is a native of alpine Sikkim and Bhutan at elevations of 16–17,000 feet above sea-level, and of the adjacent provinces of south-eastern Tibet. It was originally discovered by Sir J. D. Hooker, now seventy years ago, on the Sikkim frontier of Tibet. It bears a rather close resemblance to the more northern *P. sibirica*, Jacq., in which species, however, the scape is usually much longer and stouter, while the pedicels are shorter and the

calyx-lobes have a fringe of minute glandular hairs that is absent from *P. tibetica*. Distinctive features of this Himalayan species are the pronounced yellow "eye" and the gibbous bracts. At Kew *P. tibetica* has proved hardy and has thriven well in the Rock-garden, but like so many other members of the genus it proves in cultivation to be monocarpic and dies after flowering and ripening its seeds.

DESCRIPTION.—*Herb*, up to 6 in. in height, with very numerous slender, fibrous, pale straw-coloured roots. *Leaves* many, all radical, long-stalked, ovate-spathulate, rather rounded at the apex; lamina $\frac{2}{5}$–$\frac{2}{3}$ in. long, $\frac{1}{3}$–$\frac{2}{5}$ in. wide, papery, glabrous on both sides; pale green, with 3–4 lateral nerves; petiole $\frac{1}{3}$–1 in. long, slender, glabrous. *Scapes* 1–6, leafless, 2–5-flowered, glabrous; peduncle nearly 3 in. long, slender; pedicels erect, very slender, up to $2\frac{1}{2}$ in. long; bracts 3–5, oblong-lanceolate, somewhat acute, leafy, $\frac{1}{4}$–$\frac{2}{5}$ in. long, markedly gibbous at the base. *Calyx* narrow-campanulate, $\frac{1}{6}$ in. long, barely as long as the corolla-tube; tube $\frac{1}{10}$ in. long, glabrous; lobes ovate-lanceolate, rather blunt, with green lines on the back. *Corolla* pale rose-purple with a marked yellow eye; tube $\frac{1}{4}$ in. long, cylindric, striate; lobes deeply emarginate, spreading in a limb which is nearly $\frac{2}{3}$ in. across. *Stamens* inserted above the middle of the corolla-tube. *Style* glabrous; stigma shortly exserted. *Capsule* nearly $\frac{2}{3}$ in. long, straw-coloured, firmly membranous, dehiscing apically by 5 lobes.

TAB. 8796.—Fig. 1, bracts; 2, a flower; 3, calyx in vertical section, with pistil; 4, corolla in vertical section, showing staminal insertion:—*all enlarged.*

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Tab. 8797.

LIPARIS macrantha.

Formosa.

Orchidaceae. Tribe Epidendreae.

Liparis, *Rich.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 495.

Liparis macrantha, *Rolfe in Ann. Bot.* vol. ix. p. 156; *in Journ. Linn. Soc. Bot.* vol. xxxvi. p. 7; *et in Orch. Rev.* 1916, p. 79; species a caeteris hujus generis ob flores maximos atropurpureos facillime distinguenda.

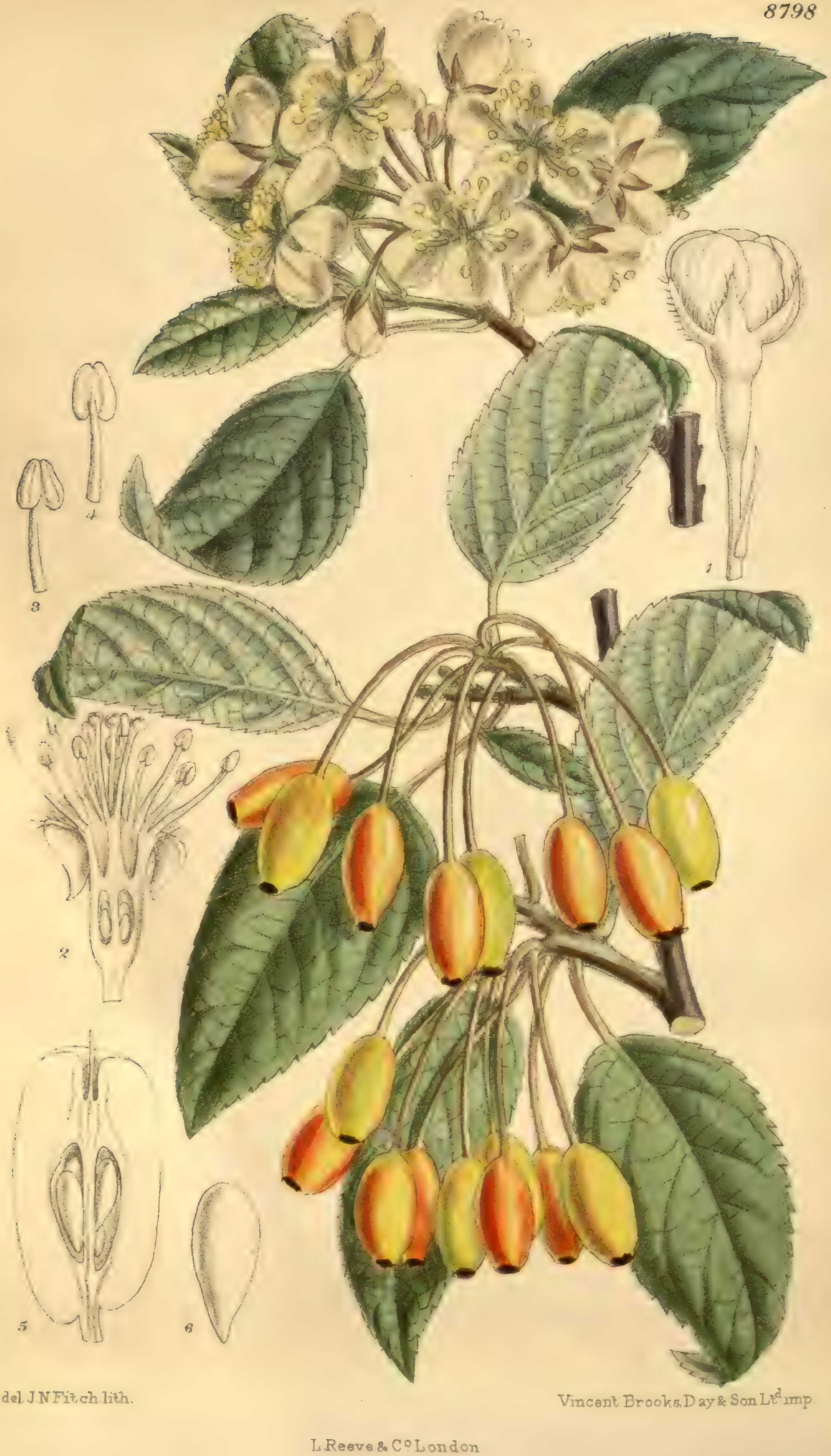
Herba terrestris. *Caules* erecti, crassiusculi, 10-15 cm. alti. *Folia* petiolata, patentia vel recurva, ovato-elliptica vel late elliptica, subacuta vel breviter acuminata, margine undulata, plicata, membranacea, 10–16 cm. longa, 5–7 cm. lata; petiolus 3–4 cm. longus, basi dilatatus, tubuloso-vaginatus. *Scapus* erectus, 20–30 cm. altus; racemus 15–20 cm. longus, laxe multiflorus; bracteae patentes vel recurvae, triangulares, acutae, 0·5–0·8 cm. longae, pedicelli patentes, 1·5–2 cm. longi, purpurei. *Flores* pro genere maximi, atropurpurei. *Sepala* patentia, lineari-lanceolata, 1·5–2 cm. longa, apice acuminata, recurva vel revoluta. *Petala* elongato-linearia, acuta, 1·5–2 cm. longa. *Labellum* breviter unguiculatum, recurvum, obcordato-orbiculare, emarginatum, 1·5–1·8 cm. latum, margine fimbriato-dentatum, basi tuberculatum; discus longitudinaliter concavo-canaliculatus. *Columna* subgracilis, incurva, 5–6 mm. longa. *Pollinia* 2, obovato-elliptica.—R. A. Rolfe.

The striking Orchid here figured is one of the largest flowered members of the genus *Liparis*. It is a native of the island of Formosa where it was first discovered, over twenty years ago, on Liko Hill, near Tamsui, by Mr. H. B. Morse, of the Chinese Consular Service. The upper portion of the raceme of Mr. Morse's original specimen, which was communicated to Kew by Professor A. Henry, had been lost; a single flower, however, remained attached to the base of the inflorescence, and thus admitted of the preparation of a description of the species, as *L. macrantha*. The plant was met with again by Mr. H. J. Elwes in the low country near Taikow in Formosa, and a living specimen brought by him to England flowered for the first time in his collection at Colesborne, Cheltenham, in February, 1916. From this plant, which was then presented to Kew by Mr. Elwes,

the plate now given has been prepared. The species belongs to the section *Molliaefoliae*, and is a striking plant on account of its large undulate leaves, its long raceme of vinous-purple flowers, and its large lip which is strongly toothed on the margin. At Kew *L. macrantha* has thriven well in a tropical Orchid House under the conditions and treatment suitable for Indian species of *Calanthe*.

DESCRIPTION.—*Herb*, terrestrial. *Stem* erect, rather stout, 4–6 in. high. *Leaves* petioled, spreading or recurved, ovate-elliptic or broadly elliptic, subacute or shortly acuminate, undulate, plicate, membranous, 4–6½ in. long, 2–3 in. wide; petiole 1½–1¾ in. long, dilated and sheathing at the base. *Scape* erect, 8–12 in. high; raceme 6–8 in. long, lax, many-flowered; bracts spreading or recurved, triangular, acute, ⅕–⅓ in. long; pedicels spreading, ⅔–¾ in. long, purple. *Flowers* large for the genus, dark purple. *Sepals* spreading, linear-lanceolate, ⅔–¾ in. long, acuminate, recurved or revolute. *Petals* elongated linear, acute, ⅔–¾ in. long. *Lip* short-clawed, recurved, obcordate-orbicular, emarginate, ⅔–¾ in. wide, margin fimbriately toothed, base 2-tuberculate, disk channelled longitudinally. *Column* incurved, rather slender, ⅕–¼ in. long. *Pollinia* 2, obovate-elliptic.

TAB. 8797.—Fig. 1, column and base of lip; 2, column with the anther-cap removed; 3, pollinia; 4, sketch of an entire plant:—*all enlarged except* 4, *which is much reduced.*



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Tab. 8798.

MALUS rivularis.

Western North America.

Rosaceae. Tribe Pomeae.

Malus, *Mill.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 626 (Pyrus).

Malus rivularis, *Roemer in Fam. Syn.* vol. iii. p. 215; *Sarg. in Trees of N. Amer.* p. 355, fig. 279; *Howell in Flora of N.W. Amer.* vol. i. p. 164; *C. K. Schneider in Handb. Laubholzk.* vol. i. p. 724; species *M. Toringo*, Sieb. et *M. Sargentii*, Rehder, magnopere accedens, cum ambabus calyce maturo deciduo congruens, ab ambabus calyce juvenili dentibus tubo brevioribus fructibusque ellipsoideis diversa.

Arbor 5–9 vel nonnunquam 12-metralis, caule 3–4·5 dm. crasso; novelli primum cinereo-pubescentes, demum glabri, annotini purpureo-brunnescentes. *Folia* decidua, ovata vel ovato-lanceolata, acuta vel acuminata, basi saepius rotundata raro cuneata, supra medium nonnunquam obscure lobata, margine minute acute serrata, 3·7–8·7 cm. long, 2–3·7 cm. lata; supra saturate viridia primum puberula demum glabra, subtus pallidiora persistenter pubescentia; petiolus 1·2–3·7 cm. longus, pubescens. *Flores* 2–2·5 cm. lata, terminales vel in axillis foliorum superiorum, in corymbos 8–12-floros 5–7·5 cm. latos aggregati, aestate ineunti aperti. *Calyx* 5-lobus; tubus obconicus, pubescens; lobi lanceolati, 5 mm. longi, extra parce pubescentes vel glabri, intus dense pallide cinereo-floccosi. *Petala* 5, orbicularia, breve unguiculata et prope basin parce irregulariter dentata, alba vel badia, 1·5 cm. longa. *Stamina* 16–20; filamenta explanata glabra. *Styli* 2–5, saepissime 3, prope basin connati, glabri. *Fructus* ovoideo-oblongus, pendulus, 1·2–2 cm. longus, 1 cm. latus, glaber, auctumno fere peracto maturescens, tunc luteus et a latere solem spectante puniceo-suffusus, vel in locis umbrosis viridescens, apice calyce delapso fovea distincta notatus; pedunculus fructiger gracilis, 2·5–3·7 cm. longus, glabrescens. *Semina* saepius 3, 1 cm. longa, apiculata, compressa, pallide brunnea.—*Pyrus rivularis*, Dougl. apud Hook. Fl. Bor.-Amer. vol. i. p. 203, t. 68; Sarg. in Silva of N. Amer. vol. iv. p. 77, t. 170; Elwes & Henry in Trees of Gt. Brit. and Ireland, vol. vi. p. 1569; Jepson in Trees of Calif. p. 189; Bean in Trees and Shrubs, vol. ii. p. 292. *P. fusca*, Rafin. in Med. Fl. vol. ii. p. 254; C. K. Schneider, loc. cit. sup. *P. diversifolia*, Bong. in Mém. Acad. Sci. St. Pétersb. ser. 6. ii, p. 133. *Malus diversifolia*, Roem. loc. cit. supra.—W. J. Bean.

Of the genus *Pyrus* as conceived by Linnaeus and adopted by Bentham and Hooker, the section *Malus*, or the crabs, is poorly represented on the continent of North America, some four or five species only being found there; the pears (*Pyrophorum*) are not represented at all. *Malus rivularis* is the only crab found west of

the Rocky Mountains where, however, it extends over many degrees of latitude, reaching from Alaska through British Columbia, Oregon and Washington to California. It belongs to the same group of crabs as *M. Toringo*, Sieb. and *M. Sargentii*, Rehd., figured at t. 8757 of this work, all characterised by the calyx falling away from the apex of the fruit. From both the other species *M. rivularis* is well distinguished by its ellipsoid fruits and by the shorter lobes of the calyx as compared with the calyx-tube. The fruit has a rather pleasant acid flavour and is variable in size and colour. On our plant, which was obtained for Kew from a continental nursery in 1905, they appear to be larger and more cylindrical than is usual. According to Sargent this crab in a wild state affects moist situations where the soil is deep and rich, often forming in such places large impenetrable thickets. Archibald Menzies, the surgeon and botanist attached to Vancouver's expedition of survey, appears to have been the first European scientific observer to find it, which he did about 1793. David Douglas collected it some thirty years later, and it is said by Loudon to have been introduced in 1836. It has never been much cultivated in English gardens, although it is very hardy and grows vigorously, and is quite attractive when laden with its distinct and handsome fruits.

Description.—*Tree*, 15–30, sometimes 40 ft. high, the trunk 1–1½ ft. in diameter; young shoots clothed with grey hairs at first, becoming glabrous; purplish-brown the second season. *Leaves* deciduous, ovate to ovate-lanceolate, acute or acuminate, usually rounded or occasionally cuneate at the base, sometimes obscurely lobed above the middle, finely and sharply serrate; 1½–3½ in. long, ¾–1½ in. wide; dark dull green, and at first puberulous above, finally glabrous; paler and pubescent beneath; petiole ½–1½ in. long, pubescent. *Flowers* ¾–1 in. wide, terminal or produced in the axils of the terminal leaves, 8–12 forming a corymb 2–3 in. wide, expanding in May. *Calyx-tube* obconic, pubescent; lobes 5, lanceolate, $\frac{3}{16}$ in. long, slightly pubescent or glabrous outside, thickly covered with pale grey wool within. *Petals* 5, orbicular with a short claw and a few jagged teeth near the base, ⅝ in. long, creamy white. *Stamens* 16–20; filaments glabrous, flattened. *Styles* 2–5 (usually 3) joined near the base, glabrous. *Fruit* ovoid-oblong, pendulous, ½–¾ in. long, ⅜ in. wide, glabrous, ripe in October and then yellow tinged with pink on the sunny side, greenish in the shade, the calyx falling away and leaving a small pit at the apex; peduncles slender, 1–1½ in. long, glabrescent. *Seeds* $\frac{3}{16}$ in. long, pointed, compressed, pale brown, usually 3 in each fruit.

Tab. 8798.—Fig. 1, unexpanded flower; 2, section of flower with petals removed; 3 and 4, stamens; 5, section of fruit; 6, seed:—*all enlarged.*

2

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Tab. 8799.

WITTIA panamensis.

Panama.

Cactaceae. Tribe Echinocacteae.

Wittia, *K. Schum. in Monatsschr. Kakt.* 1913, p. 117.

Wittia panamensis, *Britton & Rose in Contrib. U.S. Nat. Herb.* vol. xvi. p. 241, t. 73, et p. 261 ; *Vaupel in Monatsschr. Kakt.* 1913, p. 107 ; affinis *W. amazonicae*, K. Schum., sed caulibus angustioribus, floribus basi attenuatis et calycis squamulis differt.

Herba succulenta. *Caules* parce ramosi, elongati, compressi, foliaceo-dilatati, ad margines remote crenati, nervo medio valido, 3–4·5 cm. lati. *Flores* axillares, a basi crenularum orti, 2·5–3 cm. longi, saturate purpurei. *Calycis* tubus ultra ovarium longe productus, subgracilis, basi sqamulis paucis minutis scariosis obtectus ; 1·5 cm. longus ; lobi 10, biseriati, erecti, petaloidei, oblongi, obtusi, exteriores subcarinati, interiores sublongiores et tenuiores. *Petala* 10, erecta, oblonga, apiculata, alba, sepalis paullo breviora. *Stamina* numerosa, inclusa, 3–4 cm. longa ; filamenta gracilia ; antherae oblongae. *Stylus* subexsertus, gracilis, 1·5 cm. longus ; stigmata 4 vel 5, suberecta, oblonga. *Fructus* ovoideus, circiter 1 cm. longus, albo-viridis vel carneus.—R. A. Rolfe.

The genus *Wittia* is singular among the *Cactaceae* in combining with the habit of *Phyllocactus* and *Epiphyllum* the character of possessing very small flowers. It was originally described by Dr. K. Schumann in 1911, and was based on a Peruvian species which he named *W. amazonica*; the plant in question was collected by Mr. Ule near Lacaitia and also near Tarapoto. The description of *W. amazonica* had just appeared when in October, 1911, a second species was met with by Mr. H. Pittier on the mountains above Chapo in Panama. This plant flowered at Washington some months afterwards and in due course was described and figured by Messrs. Britton and Rose as *W. panamensis*. In 1914 a plant of *W. panamensis* was presented to the Kew collection by Mr. D. Fairchild, Department of Agriculture, Washington. This plant, which has thriven well in the Succulent House at Kew, flowered there in May, 1917,

when our figure was prepared. Since then Britton and Rose have been able to describe, as *W. costaricensis*, yet another species, also collected by Pittier, but on this occasion on the west coast of Costa Rica. Britton and Rose also remark that *Wittia* is a strange genus, having stems resembling those of *Epiphyllum* and *Rhipsalis*, with flowers very different from those of either of these genera.

DESCRIPTION.—*Herb*, with succulent, sparingly branched, elongated, flattened stems, which are leafy in appearance, are distantly crenate along the margin, exhibit a stout median rib, and attain a width of $1\frac{1}{4}$–$1\frac{3}{4}$ in. *Flowers* axillary, borne at the bases of the crenations, 1–$1\frac{1}{4}$ in. long, deep purple. *Calyx* with a rather slender tube about $\frac{2}{3}$ in. long, which is produced well beyond the ovary, and clothed at the base with a few minute scarious scales; lobes 10, 2-seriate, erect, petaloid, oblong and blunt at the tip, those of the outer series faintly keeled, of the inner series rather longer and of thinner consistence. *Petals* 10, erect, oblong, apiculate, white, rather shorter than the sepals. *Stamens* many, included, $1\frac{1}{4}$–$1\frac{1}{2}$ in. long; filaments slender; anthers oblong. *Style* slightly exserted, slender, nearly $\frac{2}{3}$ in. long; stigmas 4–5, nearly erect, oblong. *Fruit* ovoid, about $\frac{2}{5}$ in. long, greenish-white or flesh-coloured.

TAB. 8799.—Fig. 1, flower in vertical section; 2, stigmas:—*both enlarged.*

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Tab. 8800.

LONICERA similis, var. Delavayi.

Western China.

Caprifoliaceae. Tribe Lonicereae.

Lonicera, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 5.

Lonicera similis, *Hemsl.*, var. **Delavayi**, *Rehder in Sargent, Pl. Wilson.* vol. i. p. 142 (1911); a planta typica ramis et corollis glabris differt.

Frutex scandens, sempervirens; rami teretes, glabri. *Folia* late lanceolata, apice acuta, basi cordata usque ad 6·7 cm. longa et 2·2 cm. lata, integra; pagina superiore glabra, elevato-punctata, laete virentia, costa media nervis lateralibusque leviter impressis; inferiore cinereo-tomentella, costa nervisque elevatis, nervis lateralibus marginem versus anastomosantibus; petiolus 3 mm. longus, patule hirsutus. *Inflorescentiae* axillares et terminales; bracteae lanceolatae, acutae, 2 mm. longae, ciliolatae; bracteolae orbiculares, 1 mm. diametro, glabrae. *Calycis* dentes deltoidei, acuti, 1 mm. longi, ciliolati. *Corolla* 4·5 cm. longa, glabra, tubo tenui cylindrico 1·75 mm. diametro vix gibboso, limbo bilabiato 1·2 cm. longo, lobo inferiore lineari, 2 mm. lato, superiore breviter quadrilobo, 9 mm. lato. *Filamenta* 1·5 cm. longa, glabra; antherae 4 mm. longae. *Receptaculum* (*ovarium*) cylindricum, 3 mm. longum, 1·5 mm. diametro, glabrum; stylus 6 cm. longus, glaber; stigma capitatum. *Bacca* ovoidea, 9 mm. longa, 7 mm. diametro.—*L. Delavayi*, Franch. in Journ. de Bot. vol. x. p. 310 (1896); Bean, Trees and Shrubs, vol. ii. p. 41.—W. B. Turrill.

The Honeysuckle here figured was originally discovered by the late Abbé Delavay in South-Western China, and was at first regarded by the late Mr. Franchet as a distinct species which he named in compliment to its distinguished collector. The more ample material now available has, however, led Mr. Rehder to think that it is only a glabrescent variety of *Lonicera similis*, Hemsl. The plant from which our figure has been prepared was presented to Kew in 1910 by the late Mr. M. L. de Vilmorin, who had raised plants at Les Barres from seeds received from South-Western China in 1901, some of which flowered for the first time in 1904. Among the nearer allies of *L. similis*, var. *Delavayi*, are *L. macrantha*, Wall., from which it differs in having a longer, glabrous corolla-tube, and *L. longiflora*, DC., from which it is

easily distinguished by the leaves being grey-tomentellous beneath and cordate at the base. All three belong to the group *Longiflorae* of the section defined as *Nintooa* by DeCandolle, within the subgenus *Chamaecerasus*. A climber of vigorous growth, *L. similis*, var. *Delavayi*, is very hardy and, being evergreen, promises to be a useful addition to a group of shrubs rather scanty in outdoor collections—the hardy evergreen climbers. Another useful quality of our plant is the circumstance that it flowers as late as August. It thrives very well in a loamy soil and can be increased by late summer cuttings.

DESCRIPTION.—*Shrub*, climbing, evergreen; branches terete, glabrous. *Leaves* wide-lanceolate, acute at the apex and cordate at the base, up to $2\frac{5}{8}$ in. long and $\frac{5}{6}$ in. wide, entire, upper surface glabrous, with raised dots, bright green, the midrib and lateral nerves slightly impressed, lower surface cinereous-tomentellous, the midrib and nerves raised and the lateral nerves anastomosing towards the margin; petiole $\frac{1}{8}$ in. long, hirsute with spreading hairs. *Inflorescences* axillary and terminal; bracts lanceolate, acute, $\frac{1}{12}$ in. long, ciliolate; bracteoles orbicular, $\frac{1}{24}$ in. in diameter, glabrous. *Calyx* small, with deltoid, acute teeth, $\frac{1}{24}$ in. long, ciliolate. *Corolla* $1\frac{3}{4}$ in. long, glabrous, tube slender, cylindric, nearly $\frac{1}{12}$ in. wide, hardly gibbose, limb two-lipped, nearly $\frac{1}{2}$ in. long, the lower lip linear, $\frac{1}{12}$ in. broad, the upper lip shortly 4-lobed, $\frac{3}{8}$ in. broad. *Filaments* nearly $\frac{1}{3}$ in. long, glabrous; anthers $\frac{1}{6}$ in. long. *Receptacle* (*ovary*) cylindric, $\frac{1}{8}$ in. long, $\frac{1}{16}$ in. in diameter, glabrous; style $2\frac{1}{3}$ in. long, glabrous; stigma capitate. *Berry* ovoid, $\frac{1}{3}$ in. long, $\frac{1}{4}$ in. wide.

TAB. 8800.—Fig. 1, a pair of flowers, the corollas removed; 2 and 3, anthers; 4, stigma; 5, transverse section of ovary; 6, fruit:—*all enlarged except* 6, ***which is of natural size.***

2

1

3

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Tab. 8801.

PRIMULA bellidifolia.

Sikkim.

Primulaceae. Tribe Primuleae.

Primula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 631.

Primula (§ Capitatae) **bellidifolia**, *King ex Hook. f. Fl. Brit. Ind.* vol. iii. p. 486 (1882); *Pax et Knuth in Engl. Pflanzenr.—Primul.* p. 95; *Watt in Journ. Hort. Soc.* vol. xxxix. p. 199 (1913); species foliis membranaceis duplo crenato-dentatis appresse strigoso-pubescentibus, floribus dense capitatis distincta.

Herba usque ad 25 cm. alta. *Folia* radicalia, spatulato-obovata, basi cuneata in petiolum subalatum incurvatim attenuata, apice rotundata, 4–8 cm. longa, 1·5–2·8 cm. lata, sicco membranacea, duplo crenato-dentata dentibus minutissime mucronatis, utrinque appresse setuloso-pubescentia, nervis lateralibus pinnatis basalibus ascendentibus; petiolus usque ad 3·5 cm. longus, utrinque pubescens, medio circiter 3·5 mm. latus. *Flores* sessiles, reflexi, in capitulum 4 cm. diametro longe pedunculatum aggregati, numerosi (circiter 15); pedunculus usque ad 23 cm. longus, glaber; bracteae minutae. *Calyx* extra parce farinosus, late campanulatus, fere ad basin 5-lobus, circiter 6 mm. longus, lobis oblongo-ellipticis obtusis ad 3 mm. latis viridibus marginibus papilloso-ciliolatis. *Corolla* violacea; tubus cylindricus, 1 cm. longus, extra glaber, lobis 5 late obovatis profunde et late emarginatis in limbum 1·5 cm. diametro expansis. *Antherae* subexsertae, 1 mm. longae. *Ovarium* globosum; stylus ovario aequilongus, stigmate crasso bifido coronatus. *Capsula* haud visa.—J. Hutchinson.

The pleasing *Primula* here figured is a native of the Eastern Himalaya, belonging to the *Capitatae* section of the genus, from all other members of which it is distinguished by its doubly and rather coarsely toothed membranous leaves which are adpressed strigose-pubescent on both surfaces. It has been regarded by Sir George Watt as the East Himalayan representative of the well-known *P. farinosa*, Linn., which extends from North America through Europe to Western Tibet. Our species was first discovered on Alpine slopes in Sikkim, at elevations of 13,000 feet, by one of the native collectors employed by Sir George King, who, recognising it as distinct, gave it the name *P. bellidifolia*. The plant

from which our figure has been prepared was one of a number raised from seed presented to Kew in 1915 by Messrs. Bees, Limited, for whom it had been collected in Alpine Bhutan in 1914 by Mr. R. E. Cooper. The species has thriven well at Kew, and plants put out of doors in the Rock Garden flowered freely in May. Other plants grown in pots in a cool frame flowered equally freely and were exhibited in the Alpine House. Like its allies *P. farinosa*, Linn., and *P. denticulata*, Sm., between which it is in general features intermediate, *P. bellidifolia* has proved monocarpic. The plants in this instance, however, though behaving as if quite hardy, unfortunately died after flowering without ripening their seed.

Description.—*Herb*, up to 10 in. high. *Leaves* all radical, spathulate-obovate, tip rounded, base cuneate then curvately narrowed into the somewhat winged petiole, 1¾–3 in. long, ⅔–1⅛ in. wide, when dry membranous, margin doubly crenate-toothed, the teeth finely mucronate, adpressed setulose-pubescent on both surfaces, lateral nerves pinnate the lowest ascending; petiole up to 1½ in. long, pubescent above and below. *Flowers* sessile, reflexed, clustered in a long-stalked usually about 15-flowered head, 1¾ in. across; peduncle over 9 in. long, glabrous; bracts minute. *Calyx* sparingly mealy without, wide campanulate, 5-lobed almost to the base, about ¼ in. long; lobes oblong-elliptic, blunt, up to ⅛ in. wide, green with papillosely ciliate margins. *Corolla* violet; tube cylindric, over ⅓ in. long, glabrous outside; lobes 5, wide obovate, deeply and broadly emarginate, expanded in a limb ⅔ in. across. *Anthers* slightly exserted, very small. *Ovary* globose; style about as long as the ovary, tipped by a stout 2-fid stigma. *Capsule* not yet seen.

Tab. 8801.—Fig. 1, calyx; 2, corolla laid open; 3, pistil:—*all enlarged*.

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Tab. 8802.

RHODODENDRON OLEIFOLIUM.

Yunnan.

Ericaceae. Tribe Rhodoreae.

Rhododendron, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron oleifolium, *Franch. in Bull. Soc. Bot. France,* vol xxxiii. p. 235 (1886); *Hemsl. in Journ. Linn. Soc.* vol. xxvi. p. 28 (1889); *Millais, Rhodod.* p. 220 (1917); species *R. racemoso*, Franch., affinis sed foliis lanceolatis vel oblongo-lanceolatis, corollae tubo extra basin versus molliter pubescente, stylo inferne lepidoto differt.

Frutex nanus usque ad 0·75 m. altus, superne laxe ramosus; caulis cinereo-stramineus, glaber; ramuli annotini ferruginei, minute lepidoti, hornotini dense lepidoti. *Folia* laxa, lanceolata vel oblongo-lanceolata, utrinque acuta vel basi subobtusa, 2·5–6 cm. longa, 0·8–1·7 cm. lata, chartacea, supra primum lepidota, mox glabra et opaca, viridia, infra subglauca, lepidota, squamis carnosis parvis paulo magis diametro suo distantibus; costa supra immersa, infra prominens; nervi laterales utrinsecus 8–10, infra prominuli; petiolus 3–4 mm. longus, lepidotus. *Flores* axillares, solitarii vel bini; gemmae floriferae anguste ellipsoideae, sub anthesin circiter 1 cm. longae, squamis brunneis dorso elepidotis superioribus minutissime ciliolatis; pedicelli brevissimi, vix ultra squamas exserti, dense lepidoti. *Calyx* 5-lobus, lobis ovato-triangularibus obtusis 2 mm. longis basin versus extra parce lepidotis. *Corolla* rosea, tubulosa, 2·5–3 cm. longa, 5-loba; tubus 1·5 cm. longus, apice 1–1·3 cm. diametro, superne lepidotus, basin versus elepidotus sed molliter pubescens; lobi late ovati, apice rotundati, circiter 1–1·5 cm. longi, dorso dense lepidoti. *Stamina* 10, corollae tubo longiora; filamenta complanata, basin versus pubescentia; antherae 3 mm. longae. *Ovarium* 5-loculare, dense lepidotum; stylus corolla subaequilongus, basin versus lepidotus et parce pubescens, stigmate quinquelobulato magno coronatus. *Capsula* 1 cm. longa, ferrugineo-lepidota.—J. Hutchinson.

The *Rhododendron* now figured was first met with by the Abbé Delavay, between 1883 and 1885, on the mountain Tsang-chan, overlooking Tali in Yunnan, at about 6,700 feet above sea-level, and was described by Mr. Franchet in 1886 as *R. oleifolium.* It was met with again in 1906 by Mr. George Forrest, on the eastern flank of the Tali range, Lat. 25° 40′ N., in open alpine pastures at altitudes of 8–10,000 feet, as a dwarf shrublet a foot to two and a half feet high, with blossoms varying in colour from white to pale rose. The plant from which our illustration was made was raised at Kew under glass, from seed obtained from Messrs. Bees, Limited, early in 1915. It flowered in May, 1917, when only two years old,

thus sharing with *R. racemosum*, Franch., another Yunnan species already familiar owing to its suitability for cultivation in masses in flower-beds, and already figured at t. 7301 of this work, the characteristic of producing its blossoms at a very early stage of its career. Another feature which *R. oleifolium* shares with its near ally *R. racemosum* is that rare character in Rhododendrons, the production of solitary axillary flowers. To this peculiarity is due the distinctive habit of these two species; their leaf-bearing buds as a consequence are always terminal, and a primary shoot, having once flowered, never branches again save when it has been injured. Although the particular plant of *R. oleifolium* now depicted was raised under the protection of a cold frame we believe the species may prove hardy, for other plants, grown out of doors, have shown no signs of tenderness as yet, though the species has not been sufficiently long in cultivation to admit of our judging how resistant to English weather conditions it may be as compared with its better known ally, *R. racemosum*. From that species *R. oleifolium* is readily distinguished by the longer and narrower leaves, and especially by the presence of a soft hairy indumentum on the outside of the corolla-tube as well as by the lepidote style.

Description.—*Shrub* of small size, reaching a height of 2½ ft., laxly branched upwards; stem yellowish-grey, glabrous; shoots of the second season rusty, finely lepidote; new shoots densely lepidote. *Leaves* lax, lanceolate or oblong-lanceolate, acute, narrowed or somewhat rounded at the base, 1–2½ in. long, ⅓–⅔ in. wide, papery, at first lepidote, but soon glabrous and dull green above, somewhat glaucous and lepidote beneath, the scales small and fleshy and rather further than their own breadth apart; midrib sunk above, raised beneath; lateral nerves 8–10 along each side, raised beneath; petiole ⅛–⅙ in. long, without scales. *Flowers* solitary or in pairs, axillary; flower-buds narrow ellipsoid, about ⅔ in. long before the flowers open, their scales brown, without scales outside, the uppermost finely ciliolate, pedicels very short and hardly exserted from the scales, densely lepidote. *Calyx* 5-lobed; lobes ovate-triangular, blunt, ⅛–½ in. long, sparingly lepidote near the base outside. *Corolla* rose-coloured, tubular, 1–1¼ in. long, 5-lobed; tube ⅔ in. long, about ½ in. wide at the mouth, lepidote above, near the base devoid of scales, but there softly pubescent; lobes wide-ovate, rounded at the tip, about ½ in. long, densely lepidote outside. *Stamens* 10, longer than the corolla-tube; filaments flattened, pubescent near the base, anthers ½ in. long. *Ovary* 5-celled, densely lepidote; style about as long as the corolla, lepidote and sparingly pubescent near the base, tipped by a large 5-lobulate stigma. *Capsule* ⅔ in. long, rusty-lepidote.

Tab. 8802.—Fig. 1, portion of a leaf, showing apex and under-surface; 2, calyx and pistil; 3, a leaf-scale; 4 and 5, stamens; 6, transverse section of ovary:—*all enlarged*.

M.S del. J.N.Fitch. lith

Vincent Brooks. Day & Son Lt.d imp.

L. Reeve & Co. London

Tab. 8803.

CALANTHE tricarinata.

North India, Yunnan and Japan.

Orchidaceae. Tribe Epidendreae.

Calanthe, *R. Br.; Benth. et Hook. f. Gen. Plant.* vol. iii. p. 520.

Calanthe tricarinata, *Lindl. Gen. et Sp. Orch.* p. 252; *Wall. Cat.* n. 7339; *Lindl. Fol. Orch., Cal.* p. 2; *Hook. f. Fl. Brit. Ind.* vol. v. p. 848; *King & Pantl. in Ann. R. Bot. Gard. Calc.* vol. viii. p. 166, t. 223; *Duthie,* l.c. vol. ix. p. 119, t. 103; *Makino Ill. Fl. Jap.* vol. i. t. 14; *Rolfe in Journ. Linn. Soc.* vol. xxxvi. p. 26; *Franch. et Savat. Enum. Fl. Jap.* vol. ii. p. 26; inter species ecalcaratas floribus viridibus et purpureis distincta.

Herba terrestris, pseudobulbis ovoideis brevibus. *Folia* 2 vel 3, breviter petiolata, elliptica vel lanceolato-elliptica, subacuta, undulata, plicata, 17–30 cm. longa, 6–9 cm. lata, basi subattenuata. *Scapi* erecti, 30–50 cm. longi; racemi laxi, multiflori; bracteae deltoideae vel ovato-deltoideae, acutae, 1–1·5 cm. longae; pedicelli 2–2·5 cm. longi. *Flores* mediocres, flavo-virides, labello brunneo-rubri. *Sepala* et *petala* patentia, ovato-elliptica, subobtusa, 1·5–1·8 cm. longa. *Labellum* basi columnae adnatum, patens, trilobum, lobi laterales suborbiculares, 0·5 cm. longi; lobus intermedius obcordatus vel obcordato-orbicularis, emarginatus, undulatus, circiter 1 cm. longus; discus tricarinatus carinis crenulatis; calcar obsoletum. *Columna* oblonga, circiter 0·5 cm. longa. *Pollinia* 8, obovoideo-oblonga; stipes linearis; glandula squamiformis.—*Calanthe occidentalis,* Lindl. Fol. Orch. Cal. p. 3.—R. A. Rolfe.

Calanthe tricarinata is an old and well-known Orchid, which was first discovered by Wallich in Nepal in 1819. Since then it has been met with by various collectors in many other localities in the north-west Himalaya. In the "Flora of British India" its habitat is given as the temperate Himalaya, at elevations of 5000–9000 feet, from Kashmir to Nepal. Soon after this announcement, which was made in 1890, the species was found in Sikkim, by Pantling, at an elevation of 6000 feet, in the Lachen valley. But it had already been reported by Maximowicz to occur in grassy woods near Lake Conoma, in Japan, and it was from Japan that the species was first introduced to cultivation in this country. This introduction was in a sense accidental; the species was found among some plants of *C. Textorii*, Miq., imported

by Messrs. J. Veitch and Sons in 1879. Between the time of its discovery in Japan and of its being met with in Sikkim, Mr. A. Henry had collected *C. tricarinata* in the northern mountain forests of Yunnan at an elevation of 7000 feet. In cultivation *C. tricarinata* thrives well under the conditions suitable for other species of the genus, such as *C. Masuca*, Lindl., figured at t. 4541 of this work. The plant now figured flowered in April, 1916, in the collection of Mr. H. J. Elwes, at Colesborne Park, Gloucestershire, and was afterwards presented by Mr. Elwes to Kew. It is understood that this particular plant was obtained by Mr. Elwes from Sikkim. In spite of its wide distribution and of its introduction forty years ago, *C. tricarinata* has always been a rare plant in cultivation. It has, however, been used as one of the parents of a garden hybrid, *C. Harryana*, raised by Messrs. Veitch, the other parent in this case being *C. Masuca*.

Description.—*Herb*, terrestrial; pseudobulbs short, ovoid. *Leaves* 2–3, petioled, elliptic or lanceolate-elliptic, somewhat acute, plicate, 7–12 in. long, $2\frac{1}{4}$–$3\frac{3}{4}$ in. wide, slightly narrowed at the base. *Scapes* erect, 12–20 in. long; racemes lax, many-flowered; bracts deltoid or ovate-deltoid, acute, $\frac{2}{5}$–$\frac{3}{5}$ in. long; pedicels $\frac{3}{4}$–1 in. long. *Flowers* medium-sized, yellowish-green with a brownish-red lip. *Sepals* and *petals* spreading, ovate-elliptic, rather blunt, $\frac{3}{5}$–$\frac{3}{4}$ in. long. *Lip* adnate to the base of the column, spreading, 3-lobed; lateral lobes almost orbicular, $\frac{1}{5}$ in. long; midlobe obcordate or obcordate-orbicular, emarginate, undulate, about $\frac{2}{5}$ in. long; disk with 3 crenulate ridges; spur obsolete. *Column* oblong, about $\frac{1}{5}$ in. long. *Pollinia* 8, obovoid-oblong; stipe linear; gland scale-like.

Tab. 8803.—Figs. 1 and 2, lip and column; 3, pollinarium; 4, sketch of an entire plant :—*all enlarged except* 4, *which is much reduced.*

M S del J N Fitch lith

Vincent Brooks, Day & Son Lt^d imp

Tab. 8804.

LONICERA chaetocarpa.

Western China.

Caprifoliaceae. Tribe Lonicereae.

Lonicera, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 5.

Lonicera chaetocarpa, *Rehder in Sargent, Pl. Wilson.* vol. i. p. 137 (1911); species *L. hispidae*, Pall., affinis, planta hirsuta, foliis majoribus pagina utraque hirsutis, bracteis majoribus, corollis majoribus basi conspicue saccatis, receptaculo (ovario) setoso-glanduloso distinguitur.

Frutex compactus, 1·5-metralis; rami teretes, juniores purpurascentes, patule hirsuti. *Folia* oblongo-elliptica, apice obtusa vel subacuta, basi rotundata, saepe inaequalia, 4–5 cm. longa, circiter 2·5 cm. lata, integra, pagina superiore laete virentia plus minusve hirsuta costa media nervis lateralibusque leviter impressis, inferiore pallide virentia hirsuta costa media nervis lateralibusque prominentibus; petiolus 4–5 mm. longus. *Inflorescentiae* axillares, biflorae; pedunculi 1–1·4 cm. longi, patule hirsuti; bracteae suborbiculares, circiter 2·2 cm. diametro, hirsutae. *Calyx* 1 mm. longus, vix dentatus. *Corolla* 2·5–3 cm. longa, fauce 1·1 cm. diametro, basi sacco 5 mm. longo instructa, viridi-flava, extra hirsuta et glandulosa, lobis ovato- vel oblongo-rotundatis 9 mm. longis, 8 mm. latis. *Filamenta* 6 mm. longa, glabra; antherae 6 mm. longae. *Receptaculum* (*ovarium*) 4 mm. longum, 3 mm. diametro, dense glandulosum; stylus 3 cm. longus, parte superiore excepta hirsutus; stigma oblique capitatum.—*Lonicera hispida*, Pall., var. *chaetocarpa*, Batalin apud Rehder in Rep. Miss. Bot. Gard. vol. xiv. p. 94 (1903).—W. B. Turrill.

The plant here figured was originally described as a variety of *Lonicera hispida*, Pall., but the characters given above seem to be sufficiently definite and constant to separate it from that very variable species. Following the classification of Rehder, this species, which he terms *L. chaetocarpa*, is to be included in the *Bracteatae* group recognised by Hooker and T. Thomson within the section defined as *Isika* by DeCandolle, and thus falls within the subgenus which Linnaeus termed *Chamaecerasus*. The original specimens of *L. chaetocarpa* were collected in Kansu, but the plant has since been met with both in Szechuan and in Eastern Tibet. It was introduced to cultivation by Mr. E. H. Wilson in 1904 when collecting in Western China for Messrs. Veitch, and

the material from which our figure has been prepared was taken from a plant purchased from that firm in 1913. The Kew example is now a shrub about five feet high, of neat, rounded habit, and is evidently perfectly hardy. At Kew it is, indeed, regarded as one of the best and most satisfactory of the newer shrubby honeysuckles. It likes a good loamy soil and is easily increased by means of cuttings put in sandy soil in gentle heat during July and August. Its flowers open in early June and are of a pleasing primrose yellow.

DESCRIPTION.—*Shrub*, compact in habit, about 5 ft. high; branches terete, the younger purplish, hirsute with spreading hairs. *Leaves* oblong-elliptic, with an obtuse or sub-acute apex, rounded and often unequal at the base, 1½–2 in. long, about 1 in. broad, entire, the upper surface bright green, more or less hirsute, with the midrib and lateral nerves slightly impressed, the lower surface pale green, hirsute, the midrib and lateral nerves raised; petiole 1½–2 in. long. *Inflorescences* axillary, 2-flowered; peduncles ¾–1 in. long, hirsute with spreading hairs; bracts nearly orbicular, about ⅚ in. wide, hirsute. *Calyx* $\frac{1}{2\frac{1}{4}}$ in. long, faintly toothed. *Corolla* 1–1½ in. long, throat $\frac{5}{1\frac{1}{2}}$ in. across, with a basal sac nearly ¼ in. long, hirsute and glandular outside, lobes ovate or oblong-rounded, ⅜ in. long, ⅓ in. broad. *Filaments* ¼ in. long, ⅛ in. in diameter, densely glandular; style 1⅙ in. long, hirsute in the lower two-thirds; stigma obliquely capitate.

TAB. 8804.—Fig. 1, an inflorescence; 2 and 3, anthers; 4, transverse section of ovary:—*all enlarged.*

M S. del. J.N. Fitch lith

Vincent Brooks, Day & Son Ltd imp.

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Tab. 8805.

DESMODIUM cinerascens.

Western China.

Leguminosae. Tribe Hedysareae.

Desmodium, *Desv.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 519.

Desmodium cinerascens, *Franch. Pl. Delavay.* p. 174 (1890); affinis *D. tiliaefolio*, G. Don, petiolis brevioribus foliolis abrupte mucronatis stipulis persistentibus racemis pilosis simplicibus vel subsimplicibus differt.

Frutex laxe ramosus; rami annotini leviter angulares, glabrescentes, brunnei, hornotini purpureo-suffusi, pubescentes. *Folia* trifoliolata, petiolata, usque ad 8 cm. longa, utrinque breviter pubescentia; foliola lateralia breviter petiolulata, suborbicularia vel ovato-orbicularia, abrupte mucronata, basi truncata vel rotundata, 2·5–3 cm. longa, 2–3 cm. lata; foliolum terminale longe petiolulatum, obovato-orbiculare, basi late cuneatum, 3–4 cm. longum, 2·5–3·5 cm. latum; nervi laterales utrinsecus circiter 5; stipellae subulatae, 2 mm. longae; rhachis usque ad 6 cm. longa, pubescens, supra canaliculata; stipulae persistentes, oblique lanceolatae, acutae, 4–5·5 mm. longae, 1·5–2·5 mm. latae, brunneae, extra breviter pubescentes. *Inflorescentia* longe racemosa, multiflora, usque ad 10 cm. longa; rhachis pilosa; bracteae mox deciduae, lanceolatae, 5–6 mm. longae, extra pubescentes, intus striatae; pedicelli patuli vel leviter recurvati, graciles, ad 5 mm. longi, piloso-pubescentes. *Calyx* subaequaliter 5-lobus, 2·5 mm. longus, extra pubescens, lobis late ovatis subacutis. *Corolla* 1 cm. longa, roseo-carminea, vexillo intra basin viride-suffuso; alae plus minusve oblongae, breviter unguiculatae. *Ovarium* puberulum, 3–5 ovulatum; stylus curvatus, glaber, stigmate minuto. *Fructus* curvatus, ad 4 cm. longus, saepe 5-spermus, complanatus, crenato-constrictus, 5 mm. latus, reticulatus, parce et breviter pubescens. *Semina* nigrescentia, nitida, 3 mm. longa.—J. Hutchinson.

The *Desmodium* now figured is a native of South-western China first gathered over thirty years ago by the Abbé Delavay, by whom it is reported to occur on chalky hills near Lankong in Yunnan. It was first described from material sent by Delavay to Paris. Later it was met with by Mr. A. E. Pratt near Ta-chienlu in Szechuan, and a few years ago it was found again by Mr. G. Forrest on the eastern flanks of the Li-Kiang Range in Yunnan at elevations of 9–10,000 feet above the sea. The nearest ally of *D. cinerascens* is the North Indian species *D. tiliaefolium*, G. Don, a species of which we have as yet seen no Chinese example. The record of *D. tiliaefolium* as a native of China has been made in the

"Plantae Wilsonianae" (pars iv. p. 104); but the plant so named appears to Mr. Hutchinson to be *D. cinerascens* or some nearly allied species, rather than true *D. tiliaefolium*, which has in India been associated with *D. nutans*, Wall., and *D. argenteum*, Wall., but is considered by Mr. Hutchinson to be distinct from both. From *D. tiliaefolium*, as thus restricted, Mr. Hutchinson separates *D. cinerascens* by its shorter petioles, more rounded leaflets, persistent stipules and usually quite simple pilose racemes. *D. cinerascens* appears to have been first raised in Europe from Chinese seeds by the late Mr. M. L. de Vilmorin in 1896. It was presented to the Kew collection by him in 1907, and has proved to be quite hardy, being now a bush three to four feet high. It does not flower until late in the year, usually in October, and while this adds to its value in places where the climate is sufficiently dry and sunny to enable the flowers to develop fully, in a locality like Kew they are apt to decay prematurely through lack of sunshine and excessive humidity. For the same reason seed can rarely ripen, and the plant must be increased by late summer cuttings. The material for our plate we owe to Miss Willmott, in whose collection at Warley Place plants raised from Chinese seed collected by Mr. E. H. Wilson have grown well.

Description.—*Shrub* laxly branching; young twigs flushed with purple, pubescent; in the succeeding season glabrous, brown, slightly angular. *Leaves* 3-foliolate, petioled, up to 3 in. long, shortly pubescent on both surfaces; lateral leaflets shortly petiolulate, ovate-orbicular or nearly orbicular, abruptly mucronate, with a rounded or truncate base, 1–1¼ in. long, ¾–1¼ in. wide; end-leaflet long-petiolulate, obovate-orbicular with a wide-cuneate base, 1¼–1½ in. long, 1–1⅓ in. wide; lateral nerves about 5 on each side the midrib; stipels subulate, $\frac{1}{12}$ in. long; rachis up to 2¼ in. long, pubescent, channelled above; stipules persistent, obliquely lanceolate, acute, $\frac{1}{6}$–$\frac{1}{5}$ in. long, $\frac{1}{16}$–$\frac{1}{10}$ in. wide, brown, slightly pubescent externally. *Inflorescence* up to 4 in. long, racemose, many-flowered; rachis pilose; bracts soon disappearing, lanceolate, $\frac{1}{5}$–$\frac{1}{4}$ in. long, pubescent outside, striate within; pedicels spreading or slightly recurved, slender, up to $\frac{1}{5}$ in. long, pilose-pubescent. *Calyx* almost equally 5-lobed, $\frac{1}{10}$ in. long, pubescent outside; lobes wide-ovate, rather acute. *Corolla* $\frac{2}{5}$ in. long, rose-carmine standard flushed with green at the base within; wings more or less oblong, shortly clawed. *Ovary* puberulous, 3–5-ovuled; style distinctly curved, glabrous; stigma minute. *Fruit* curved, up to 1½ in. long, usually 5-seeded, flattened, crenately constricted, $\frac{1}{5}$ in. wide, reticulate, sparingly and shortly pubescent. *Seeds* blackish, shining, $\frac{1}{8}$ in long.

Tab. 8805.—Fig. 1, tip of a leaf; 2, flower; 3, a flower, the petals removed; 4, wing-petal; 5, keel-petal; 6, anther; 7, pistil; 8, fruit:—*all enlarged*.

M.S.del. J.N Fitch.lith.

Vincent Brooks. Day & Son Lt^d imp.

Tab. 8806.

IPOMOEA Pes-tigridis, var. longibracteata.

Tropical Africa.

Convolvulaceae. Tribe Convolvuleae.

Ipomoea, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 870.

Ipomoea Pes-tigridis, *Linn. Sp. Pl.* ed. 1, p. 162; *Choisy in Mém. Soc. Phys. Genév.* vol. vi. p. 455 *et in DC. Prodr.* vol. ix. p. 363; *Wight, Ic. Pl. Ind. Or.* t. 836; *Clarke in Hook. f. Fl. Brit. Ind.* vol. iv. p. 204; *Trimen, Handb. Fl. Ceylon*, vol. iii. p. 216; *Baker & Rendle in Dyer, Fl. Trop. Afr.* vol. iv. sect. 2, p. 158; species *I. bracteatae*, Wight, proxima, sed foliis palmatipartitis differt; a varietate *lobato*, C. B. Clarke, hujus speciei bracteis loratis vel linearibus haud cordato-ovatis facile distinguenda; **var. longibracteata**, *Vatke in Linnaea*, vol. xliii. p. 512; *Hallier f. in Ann. Istit. Bot. Roma*, vol. vii. p. 230 *et in Engl. Jahrb.* vol. xxviii. p. 34 (pro subvar.); *Baker & Rendle in Dyer, Fl. Trop. Afr.* vol. iv. sect. 2, p. 159; a typo bracteis multo longioribus et angustioribus, corolla majore differt.

Herba annua, fere ubique setis longis luteis dense vestita. *Caules* volubiles, graciles, ad 2 m. alti vel ultra. *Folia* petiolata, palmatim 5–9-partita, 7–11 cm. lata, sinibus obtusis; lobi lanceolati vel ovato-lanceolati, acuti vel plus minusve acuminati, integerrimi, 4–8 cm. longi, ·7–3 cm. lati; petiolus 5–10 cm. longus. *Pedunculi* axillares, 5–14 cm. interdum tantum 1–3 cm. longi, capitulum 2–5-florum gerentes. *Bracteae* loratae vel lineares, acuminatae, 2–3 cm. longae, 1·5–2·5 mm. latae. *Sepala* ovato-lanceolata, acuminata, 8–12 mm. longa, ad 4 mm. lata. *Corolla* alba, tubo extra purpureo, fauce violaceo; tubus infundibuliformis, 2–2·5 cm. longus; limbus patens, ad 6 cm. latus, breviter 5-lobus, lobis emarginatis. *Stamina* inclusa, inaequalia; filamenta basi barbata; antherae oblongae, 4 mm. longae. *Ovarium* ovoideum, glabrum, 1·5 mm. longum, basi disco integro cupuliforme circumdatum; stylus filiformis, circiter 1·2 cm. longus, staminibus longioribus brevior, stigmate capitato papilloso.—*I. lophantha*, Hallier f. in Engl. Jahrb. vol. xviii. p. 134.—S. A. Skan.

This variety of the widely distributed *Ipomoea Pes-tigridis* is a new introduction to cultivation. The Kew plant which furnished the material for the figure was raised from seeds received in February, 1917, from Major Howard of Richmond, Surrey, who collected them, and also those of *I. dasysperma*, Jacq., figured at t. 8788 of this work, at Kilimatinde in the district of Ugogo, East Tropical Africa, near the railway connecting Daressalam with Tabora. It had previously been found

in other localities of the territory known as German East Africa; it is also recorded from Somaliland and British East Africa. Grown in a warm house, it flowered while still quite a small plant in April, 1918, and, being an annual, has since died. Typical *I. Pes-tigridis* ranges throughout India, where it is said to be common, growing in sandy soils; it also occurs in Ceylon, the Malay Peninsula, Malay Islands, Polynesia, China, Mauritius, and in many localities in Tropical East Africa, extending from Kordofan in the north to the Zambesi in the south; it is represented in Angola by the variety *strigosa*, Hallier f. Though of little merit as a garden plant it has appeared in cultivation from time to time, and is recorded as having been first introduced in 1732, the year of publication of Dillenius's Hortus Elthamensis, in which work (t. 318, fig. 411) it is figured as *Volubilis zeylanica, Pes-tigrinus dicta*. It is also figured in Rheede's Hortus Malabaricus, vol. xi. t. 59, under the name of *Pulli-Schovadi*. This *Ipomoea* belongs to the section *Cephalanthae*, the species of which usually have rather small flowers arranged in dense bracteate heads, with narrow herbaceous sepals more or less resembling the bracts.

Description.—*Herb*, annual, everywhere densely beset with long yellow stiff hairs. *Stem* twining, slender, 6 ft. long or longer. *Leaves* stalked, palmately 5–9-partite, 3–4½ in. wide with rounded sinuses; lobes lanceolate or ovate-lanceolate, acute or more or less acuminate, quite entire, 1½–3 in. long, ⅓–1¼ in. wide; petiole 2–4 in. long. *Peduncles* axillary, usually 2–5½ in. long, but occasionally only ⅔–1¼ in. long, bearing 2–5-flowered blossom-heads. *Bracts* lorate or linear, acuminate, ¾–1¼ in. long, ⅔–1 in. wide. *Sepals* ovate-lanceolate, acuminate, ⅓–½ in. long, up to ⅙ in. wide. *Corolla* white with the tube purple outside and the throat violet within; tube funnel-shaped, ¾–1 in. long; limb spreading, reaching 2¼ in. in breadth, shortly 5-lobed; lobes emarginate. *Stamens* included; of unequal length; filaments bearded at the base; anthers oblong, ⅛ in. in length. *Ovary* ovoid, glabrous, $\frac{1}{16}$ in. long, surrounded at the base by the entire cup-shaped disk; style filiform, about ½ in. long, shorter than the longest of the stamens; stigma capitate, papillose.

Tab. 8806.—Fig. 1, portion of a leaf; 2, calyx and pistil, with the basa portion of a bract; 3, base of the corolla-tube, laid open and showing three of the stamens; 4, anther; 5, ovary in longitudinal section;—*all enlarged*.

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Tab. 8807.

DISPORUM pullum, var. brunnea.

China.

Liliaceae. Tribe Uvularieae.

Disporum, *Salisb.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 831.

Disporum pullum, *Salisb.*, var. **brunnea,** *C. H. Wright;* varietas notabilis, a typo segmentis perianthii longioribus apice explanatis distinguenda.

Herba. *Caulis* ramosus, glaber. *Folia* lanceolata, acuminata, 6·5 cm. longa, 1·5–2 cm. lata, basi rotundata, supra glabra, marginibus facieque inferiore puberulis; nervi laterales utrinsecus 7–9, quorum 2, raro 3, costam mediam referentes, caeteris crassiores; petioli vaginati, 4 mm. longi. *Pedunculus* 3 mm. longus, puberulus, 3–5-florus; pedicelli nutantes, usque ad 2·5 cm. longi, costis longitudinalibus papillatis instructi. *Perianthii* segmenta oblanceolata, acuminata, distincte carinata, basi saccata, marginibus parte superiore minute denticulata, apice explanata, purpureo-brunnea, 2·8 cm. longa, 6 mm. lata. *Filamenta* subulata, dilute viridia, 1·5 cm. longa; antherae prope basin dorsifixae, sagittatae, acutae, 4 mm. longae. *Ovarium* obconicum, viride, 3 mm. altum, 2 mm. diametro; stylus cylindricus, albus, 1·4 cm. longus; rami 3, recurvi, 6 mm. longi, facie interiore stigmatici; ovula geminata, collateralia, erecta.—C. H. Wright.

The *Disporum* now figured is a native of Western Hupeh, where it was first met with by Mr. E. H. Wilson. The plant from which our plate has been prepared flowered in 1917 in the collection of Miss E. A. Willmott, Warley Place, where seeds obtained by Wilson had been received from the Arnold Arboretum. Only one of these seeds, we learn from Miss Wilmott, germinated in her garden. The resulting plant throve well in good sandy loam in a sheltered and partially shaded border with a south-western exposure. A few flowers only were produced during the first season after planting out; since then, however, the plant has flowered freely each year and has ripened seeds well, thus admitting of ready propagation. Care has, however, to be taken to protect the ripening fruits against attack by birds. The genus *Disporum* was based by Salisbury in 1812 on a Chinese plant, *Disporum pullum*, which had been already de-

scribed at t. 916 of the "Botanical Magazine" as *Uvularia chinensis*, Ker-Gawl., and the plant now figured, though it differs sufficiently from the original type of *D. pullum* to deserve a separate plate, hardly merits, in the present state of our knowledge, the status of a distinct species. Sir Joseph Hooker has referred in the "Flora of British India" to the difficulty met with in the discrimination, from herbarium material alone, of the various forms that occur in the genus *Disporum*. In the case of those forms generally included in *D. pullum* this difficulty is especially great, and this species, as now understood, contains a number of more or less distinct states differing from each other in the width and degree of pubescence of the leaves, the length of the peduncle, the size of the flower, and the colour of the perianth-segments which varies from white to deep-purple. In the form here figured there is another marked distinction; the perianth-segments, instead of being straight, at length spread stellately towards their tips. For this reason it is now provisionally accorded the rank of a distinct variety, whose name, *brunnea*, is derived from the circumstance that these segments are of the purplish-brown colour indicated at n. 72 of the "Code des Couleurs" of Messrs. Klincksieck and Valette.

Description.—*Herb*, with a glabrous, branching stem. *Leaves* lanceolate, acuminate, $2\frac{1}{2}$ in. long, $\frac{2}{3}$–$\frac{3}{4}$ in. wide, rounded at the base, glabrous above, puberulous beneath and along the margin; lateral nerves 7–9 on each side the midrib, 2 sometimes 3 of them resembling the central nerve; petiole sheathing, $\frac{1}{6}$ in. long. *Peduncle* $\frac{1}{8}$ in. long, puberulous, 3–5-flowered; pedicels nodding, about 1 in. long, with distinct longitudinal papillose lines. *Perianth* composed of 6 oblanceolate, acuminate, distinctly keeled segments, saccate at the base, with the margin of the upper two-thirds finely denticulate, spreading at the tip, purplish-brown, $1\frac{1}{8}$ in. long, $\frac{1}{4}$ in. wide. *Filaments* subulate, pale green, $\frac{2}{3}$ in. long; anthers dorsifixed near the base, sagittate, acute, $\frac{1}{6}$ in. long. *Ovary* obconic, green, $\frac{1}{8}$ in. long, $\frac{1}{12}$ in. across; style cylindric, white, over $\frac{1}{2}$ in. long; branches 3, recurved, $\frac{1}{4}$ in. long, stigmatic on the inner face; ovules geminate, collateral, erect.

Tab. 8807.—Fig. 1, outer perianth-segment, and stamen seen from within; 2, inner perianth-segment; 3, stamen; 4, pistil:—*all enlarged*.

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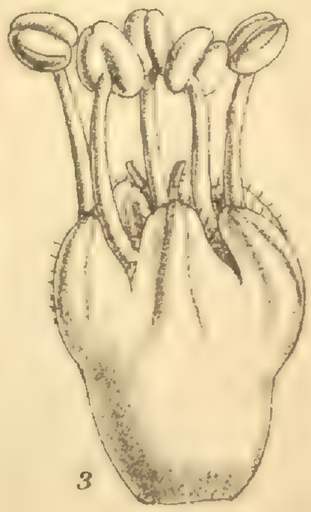
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Tab. 8808.

KOCHIA scoparia, forma trichophila.

Garden Origin.

Chenopodiaceae. Tribe Camphorosmeae.

Kochia, *Roth ; Benth. et Hook. f. Gen. Plant.* vol. iii. p. 60.

Kochia scoparia, *Schrad. Neues Journ.* vol. iii. nn. III. & IV. p. 85 ; forma **trichophila**, *Schinz. & Thell. Verz. Sam. Bot. Gart. Züirich*. 1909, p. 10 ; *Graebn. in Aschers. & Graebn. Mitteleurop. Fl.* vol. v. p. 163 ; stirps primo ex cultis orta a stirpe spontanea habitu quasi plumosa foliis creberrimis angustissimis superne plerumque magis ciliatis differt ; tota planta primo amoene clareque viridis, maturitate insigniter erubescens vel purpurascens.

Herba annua, polygama, a basi ramosissima, copiose foliata, globosa, oblonga vel conico-pyramidalis, 0·5–1·5 m. alta ; rami ramulique virgati, erecti, primo tenuissime pubescentes, mox glabrati, vel apicem versus imprimis pone nodos laxe lanati. *Folia* anguste linearia vel superiora subfiliformia, acuta, longiora ultra 6 cm. longa, 3–1 mm. lata, glabra vel summa magis minusve ciliata, omnia ob areolas minutas nervis venisque crebris circumscriptas chlorophyllo destitutas albo-punctata. *Flores* 3- vel 2-ni vel solitarii, in axillis foliorum superiorum sessiles, basi saepe lana laxa circumdati, ♂ vel ♀. *Perianthium* urceolatum, 5-lobum, membranaceum, florum ♀ magis depressum, praeter lobos ciliolatos glabrum, lobis cucullato-inflexis, subapiculatis dorso carina viridi obtusa percursis, maturitate paulo mutatum nisi carinis incrassatis hincinde medio in alam crassam transversam dilatatis. *Antherae* purpureae. *Ovarium* ovoideum ; stylus brevissimus ; stigmata 2. *Fructus* depressus, lenticularis. *Pericarpium* et testa tenuiter membranacea. *Embryo* horizontalis generis.—*K. trichophila*, Hort. ex Voss, Deutsch. Gartenrat, 1904, Beil. Pflanzenk. p. 18 ; Stapf in Sam. Verz. Haage & Schmidt, 1906, et ex Haage & Schmidt in Möll. Deutsch. Gärtn. Zeit. 1906, p. 219 ; Pattlock in Möll. Deutsch. Gärtn. Zeit. 1912, p. 256. *K. trichophylla*, Hort. ex Voss. l.c. ; Schmeiss in Möll. Deutsch. Gärtn. Zeit. 1906, p. 11 cum icon. ; Burpee, Farm Annual, 1906, p. 125 (*tricophylla*) ; Rev. Hort. 1907, p. 119 ; Trib. Hort. 1907, vol. ii. p. 445 ; Journ. Hort. ser. 3, vol. lxvi. p. 495 ; Bailey in Stand. Cyclop. Hort. vol. ii. p. 1755. *K. scoparia*, var. *trichophylla*, Möll. Deutsch. Gärtn. Zeit. 1906 ; A. O[sborn] in Gard. Chron. 1906, vol. xl. p. 167 ; Ugolini in Boll. Soc. Bot. Ital. 1909, p. 191. *K. scoparia*, Journ. Hort. 1901, vol. xlvi. p. 298, cum icon. p. 294 ; Gard. Chron. 1901, vol. xxx. p. 359, fig. 110 ; ibid. 1902, vol. xxxi. p. 359.—O. Stapf.

The red Belvidere, also termed the Summer Cypress or Mock Cypress, here figured, is generally accepted as a cultivated condition of *Kochia scoparia*, Schrad., a Chenopodiaceous plant which extends from temperate

Asia westward through central and south-western Russia to Hungary. Throughout Germany as far as the Netherlands and from Central Europe southwards into the Balkan peninsula, Italy and southern France, it also occurs not infrequently as an alien. The name *scoparia*, long associated with the species, reflects the fact that throughout southern Europe the dry plant is used for making brooms. The genuine *Kochia scoparia* has been known in English gardens at least since the close of the sixteenth century; it was figured by Gerarde in 1597 as the Bushie or Besome Tode-flax, but he was already acquainted with the popular Italian name Belvidere, which during the seventeenth century appears to have been the term mostly used in English and French gardens. It is clear from Gerarde's account that the form of the plant known to him did not change in colour from green to red during the autumn, and, indeed, there is no evidence that during the next three centuries any form of *K. scoparia* exhibiting this phenomenon was known to gardeners. Nor is there any indication that during the sixteenth and seventeenth centuries the form of the Belvidere with narrower leaves figured in our plate was in cultivation in this country. We do not till 1759 find any evidence that suggests the existence of *K. scoparia*, forma *trichophila*, in British gardens. This evidence comes from Scotland, and the seed of the narrow-leaved form appears to have arrived there from Holland as Belvidere, under which name it appears in a Haarlem seed-list of 1754. We learn from Miller's "Gardeners' Dictionary" of 1768 that the narrow-leaved form was in English gardens, but we find no allusion to any save a green Belvidere throughout the eighteenth century. With the establishment of the form with nearly filiform leaves just after the middle of that century, the cultivation of the true *K. scoparia* appears to have been abandoned. During the later half of the nineteenth century the same became very nearly the case as regards the green narrow-leaved form, its cultivation being continued only in large establishments like that at Kew. At the close of the century, however, interest in this old-fashioned plant became resuscitated owing to the discovery in or shortly before 1898 of the

red Belvidere, which we now figure. In that year a farmer from Alleghany, Pennsylvania, visiting Riverton, New Jersey, handed to Mr. J. W. E. Tracy some seed of this plant with the information that it had been collected from a wild specimen found growing in the woods near Alleghany. The seed was made over to Mr. Henry A. Dreer, who grew it, but did not, however, take the plant up. In the following year seed was made over to Mr. Burpee who gave the plant a trial, and placed it in his catalogue for the first time in 1900. Mr. A. J. Pieters, of Washington, to whom horticulture is obliged for this information, remarked in 1906 that after having grown the plant for four years, he had found it constant as regards the change of colour which is its most striking characteristic, but that it is apt, when checked in its growth, to revert to the opener habit which marks the true *K. scoparia.* It is interesting to note that shortly after the record of this experience by Mr. Pieters, Professor Beck was in a position to describe for the first time in Reichenbach's "Icones" (vol. xxiv. p. 154: 1908) a blood-red wild form as *K. scoparia*, forma *sanguinea.* For the introduction of the red Belvidere with filiform leaves to this country we are indebted to Messrs. Cannell and Sons, Swanley, who first brought it to notice in the autumn of 1901. Although the fact is not on record, it is probable that their seed may have come from the United States. The red Belvidere is now somewhat extensively used as a summer bedding plant in gardens, a purpose for which it is well suited. It comes true to seed, and the change in colour from bright green to magenta red takes place somewhat suddenly in autumn. The change appears to mark a stage in ripening, and to be unconnected with the climatic conditions encountered by the plant whether in this country or in North America.

DESCRIPTION.—*Herb*, annual, polygamous, much branched from the base, very leafy; crown globose, oblong or conic-pyramidal, 1½–5 ft. in height; branches and branchlets virgate, erect, at first thinly pubescent, soon nearly glabrous, though often laxly woolly towards the top and especially at the nodes. *Leaves* narrow linear or the uppermost nearly filiform, acute, the longest over ¼ in. long, ⅛ in. or less wide, glabrous or the uppermost somewhat ciliate, all white-punctate. *Flowers* in threes or pairs, or solitary, sessile in the axils of the upper leaves, often surrounded at the base with loose wool, some female, some

2-sexual. *Perianth* urceolate, 5-lobed, membranous, the female rather depressed, glabrous except the lobes, which are ciliolate, inflexed and hood-like, somewhat apiculate and traversed along the back by a green blunt keel, when ripe little altered save that the keel is occasionally enlarged in the middle into a thick transverse wing. *Anthers* purple. *Ovary* ovoid; style very short; stigmas 2. *Fruit* depressed, lenticular. *Pericarp* and testa membranous. *Embryo* horizontal.

Tab. 8808.—Fig. 1, part of an inflorescence; 2, a leaf; 3, hermaphrodite flower; 4, pistil of hermaphrodite flower; 5 and 6, female flowers; 7, pistil of female flower; 8 and 9, fruits; 10, section of a fruiting calyx; 11, section of a fruit; 12, seed; 13, section of a seed; 14, embryo:—*all enlarged*.

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Tab. 8809.

ODONTOGLOSSUM CRISTATUM.

Ecuador.

ORCHIDACEAE. Tribe VANDEAE.

ODONTOGLOSSUM, *H.B. et K.; Benth. et Hook. f. Gen. Plant.* vol. iii. p. 561.

Odontoglossum cristatum, *Lindl. in Benth. Pl. Hartw.* p. 152, *et in Fol. Orch. Odontoglos.* p. 18; *Reichb. f. in Walp. Ann.* vol. vi. p. 843, *et in Gard. Chron.* 1868, p. 1014; *Ill. Hort* vol. xvii. p. 114, t. 21 (*var.* Argus, *Reichb. f.*); *Veitch, Man. Orch.* vol. i. p. 31 (excl. var.); *Rolfe in Orch. Rev.* 1917, p. 83; species ab *O. Hallii*, Lindl., floribus multo minoribus apte distinguenda.

Herba epiphytica. *Pseudobulbi* elliptico-oblongi vel ovato-oblongi, compressi, leviter striati, 6–8 cm. longi, 2–3 cm. lati, apice 2-phylli, basi 4-phylli. *Folia* lorata, subarcuata, acutiuscula, 15-22 cm. longa, 1·8–2 cm. lata, basi conduplicata. *Scapi* axillares, arcuati, 25–33 cm. longi; racemi laxe multiflori; bracteae ovato-oblongae, subacutae, conduplicatae, 0·7–1·0 cm. longae, concavae; pedicelli circiter 2 cm. longi. *Flores* speciosi. *Sepala* et *petala* patentia, elliptico-lanceolata, acuminata, 2·5–3 cm. longa, lutea, brunneo-maculata et prope apicem brunneo-suffusa. *Labellum* unguiculatum; unguis erectus, angustus, circiter 0·8 cm. longus; limbus patens, ovatus vel subpandurato-ovatus, acutus vel acuminatus, irregulariter fimbriatus, circiter 1·5 cm. longus; basi crista ampla palmatim lobata ornata. *Columna* arcuata, 1.5 cm. longa; alae rotundatae, irregulariter fimbriatae; pollinia 2, pyriformia; stipes lineari-oblongus, subincurvus; glandula oblonga.—R. A. ROLFE.

The interesting *Odontoglossum* now figured is a native of Ecuador, where it was first discovered about eighty years ago by Mr. T. Hartweg, when collecting plants for the Royal Horticultural Society of London. The locality of the original specimens was Mount Paccha, near Loxa, on the western slopes of the Andes opposite the Gulf of Guayaquil. For many years this species, which Lindley had described as *O. cristatum*, was only known from the original herbarium specimens, but in 1847 living plants of an *Odontoglossum*, collected in the Loxa district by Mr. G. Wallis, were sent to the horticultural establishment of Mr. Linden at Brussels; these plants, on flowering, were recognised as identical with Hartweg's one. At a later date the late Mr. Consul Lehmann

obtained other specimens of this species in Ecuador, in the forests of Pacayurcu, above Zaruma, also above Ayabamba and Paccha, at from 4,500–6,800 feet above sea-level. Though never a common species in cultivation, it is usually present in representative collections of Orchidaceous plants. The figure here given has been prepared from an example which flowered in the Royal Botanic Garden, Glasnevin, in March, 1917.

This plant, Sir F. Moore informs us, was presented to the Glasnevin collection by Sir Jeremiah Colman, in 1908, who had grown it at Gatton Park as an unnamed *Odontoglossum*. The species thrives under the treatment for cool-house orchids, a minimum night temperature of 50° F. in winter, with cool airy conditions in summer. A more slender plant in every way than the familiar *O. crispum*, Lindl., from New Grenada, *O. cristatum* makes finer and more delicate roots, so that care should be taken that the potting material is not too coarse. There is at Glasnevin another example of *O. cristatum*, obtained in 1893 from Mr. Cowan, of Gateacre, which was identified at Kew on its first flowering in 1894. The nearest ally of *O. cristatum* is *O. Hallii*, Lindl., another Ecuador *Odontoglossum*, which has been already figured at t. 6237 of this work.

Description.—*Herb*, epiphytic. *Pseudobulbs* elliptic- or ovate-oblong, compressed, slightly striate, $2\frac{1}{2}$–3 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, 2-foliate at the apex, 4-foliate at the base. *Leaves* lorate, slightly curved, rather acute, 6–9 in. long, $\frac{2}{3}$–$\frac{3}{4}$ in. wide, conduplicate below. *Scapes* axillary, curved, 10–14 in. long; racemes laxly many-flowered; bracts ovate-oblong, rather acute, conduplicate, $\frac{1}{3}$–$\frac{2}{5}$ in. long, concave; pedicels about $\frac{3}{4}$ in. long. *Flowers* showy. *Sepals* and *petals* spreading, elliptic-lanceolate, acuminate, 1–$1\frac{1}{4}$ in. long, yellow with brown spots and flushed with brown towards the tips. *Lip* clawed; claw erect, narrow, about $\frac{1}{5}$ in. long; limb spreading, ovate or somewhat pandurately ovate, acute or acuminate, irregularly fimbriate, about $\frac{3}{5}$ in. long, with a large palmately lobed basal crest. *Column* curved, nearly $\frac{2}{3}$ in. long; wings rounded, irregularly fimbriate; pollinia 2, pyriform; stipe linear-oblong, somewhat incurved; gland oblong.

Tab 8809.—Fig. 1, lip; 2, column; 3, pollinarium, seen from behind; 4, the same, seen from in front:—*all enlarged.*

M.S. del. J.N. Fitch lith.

Vincent Brooks, Day & Son Ltd. imp.

L. Reeve & Co. London.

Tab. 8810.

ABELIA longituba.

China.

Caprifoliaceae. Tribe Lonicereae.

Abelia, *R.Br.; Benth. et Hook. f. Gen. Plant.* vol. ii. p. 4.

Abelia longituba, *Rehder in Sargent, Plant. Wils.* vol. i. p. 126; species *A. uniflorae*, R.Br., valde affinis, sed foliis minoribus et tubo corollae longo graciliori apte distinguitur.

Frutex gracilis, ramis senioribus fuscis glabris vel leviter puberulis, junioribus purpureis dense puberulis. *Folia* ovata, elliptico-ovata vel oblongo-lanceolata, apice obtusiuscula, mucronulata, basi plus minusve cuneata, 1·5–2·6 cm. longa, 0·7–1·3 cm. lata, margine integra vel leviter serrulata, pagina superiore laete viridia, marginibus ciliatis exceptis glabra, inferiore pallida ad costam inferne praecipue albo-villosa; petioli usque ad 3 mm. longi, leviter hirsuti. *Pedunculi* uniflori, axillares, prope apices ramulorum brevium dispositi, 1 mm. longi, medio bracteis duabus subulato-linearibus ciliolatis apice bracteolis quatuor ovatis ciliolatis instructi. *Receptaculum* (*ovarium*) cylindricum, 6–7 mm. longum, 1 mm. diametro, leviter puberulum. *Sepala* 2, oblongo-elliptica, obtusa, usque ad 1 cm. longa et 6 mm. lata, leviter ciliolata, fere glabra. *Corolla* infundibuliformis, 2·3–3 cm. longa, infra medium anguste tubularis, ima basi unilateraliter ventricosa, e medio apicem versus ampliata, limbo patulo quinquelobato, lobis suborbicularibus 6 mm. longis latisque, extra minute glanduloso-puberulis, intus fauce pilis longis distinctis instructis. *Stamina* 4, filamentis 9 mm. longis plus minusve patule hirsutis, antheris 3 mm. longis, glabris. *Stylus* 2 cm. longus, glaber; stigma capitatum, vix lobatum.—W. B. Turrill.

The plant from which our plate of *Abelia longiflora* has been prepared was presented to the Kew collection by Sir John Ross of Bladensburg, in 1915. The species is a native of China, and the specimens on which the original description of Dr. Rehder was based were collected in the district of Ichang, in the province of Hupeh, by Mr. A. Henry. These original specimens differ in certain minor particulars from the cultivated plant here represented. The wild plant has all the twigs, young and old, nearly or quite glabrous, whereas in our plant the young twigs are densely clothed with short spreading hairs. The corolla in the original specimens collected by Henry are somewhat larger than in the plant received

at Kew from the collection at Rostrevor. The nearest ally of *A. longituba* is *A. uniflora*, R.Br., another Chinese species figured at t. 4694 of this work. Both species have been placed by Rehder in the section *Euabelia* and in Graebner's sub-section *Uniflorae*. There is, indeed, room for doubt as to whether *A. longituba* be really more than a variety of Brown's species. From the horticultural point of view, however, *A. longituba* is sufficiently distinct from the older species to warrant the publication of a special plate. At present the Kew plant is a dwarf shrub which flowers most copiously during the latter part of the summer, a circumstance that makes it a very welcome addition to cultivated hardy shrubs. It is perfectly hardy, grows well in loamy soil, and is easily propagated by means of cuttings put in gentle heat in July or August.

DESCRIPTION.—*Shrub*, branches slender, the older twigs dark and glabrous or slightly puberulous, the younger purple and densely puberulous. *Leaves* ovate, elliptic-ovate or oblong-lanceolate with a rather obtuse and mucronulate apex, the base more or less cuneate, $\frac{3}{5}$–1 in. long, $\frac{1}{4}$–$\frac{1}{2}$ in. wide, margin entire or slightly serrulate, upper surface bright green, glabrous except for the ciliate margins, lower pale, white-villose along the mid-rib, especially in the lower part; petioles up to $\frac{1}{8}$ in. long, slightly hirsute. *Peduncles* 1-flowered, axillary, situated near the ends of short branches, $\frac{1}{25}$ in. long, with 2 subulate-linear ciliolate bracts in the middle and 4 ovate ciliolate bracteoles at the apex. *Receptacle* (*ovary*) cylindric, about $\frac{1}{4}$ in. long, $\frac{2}{5}$ in. in diameter, slightly puberulous. *Sepals* 2, oblong-elliptic, obtuse, up to $\frac{2}{5}$ in. long, $\frac{1}{3}$ in. broad, slightly ciliolate, nearly glabrous. *Corolla* infundibuliform, from nearly 1 in. to $1\frac{1}{5}$ in. in length, tubular below the middle and ventricose on one side at the extreme base, enlarged from the middle upwards, limb spreading, 5-lobed, lobes suborbicular, $\frac{1}{4}$ in. long and broad, minutely glandular-puberulous outside, throat on the inside beset with long distinct hairs. *Stamens* 4, filaments nearly $\frac{2}{5}$ in. long, more or less spreadingly hirsute, anthers $\frac{1}{8}$ in. long, glabrous. *Style* $\frac{4}{5}$ in. long, glabrous; stigma capitate, hardly lobed.

TAB. 8810.—Fig. 1, portion of young stem; 2, portion of leaf-margin; 3, bud; 4, section of base of corolla; 5 and 6, anthers; 7, stigma:—*all enlarged*.

M S del J N Fitch. lith.

Vincent Brooks, Day & Son Lt^d imp.

L Reeve & C^o London.

Tab. 8811.

WISTARIA venusta.

Japan.

Leguminosæ. Tribe Galegeae.

Wistaria, *Nutt.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 499.

Wistaria venusta, *Rehder et E. H. Wils. in Sargent, Plant. Wils.* vol. ii. 514 (1916); species foliis utrinque molliter et breviter pubescentibus racemis brevibus et latis floribus albis calycis lobo abaxiale longissimo distincta.

Frutex scandens. *Ramuli* ultimi sicco purpureo-nigrescentes, annotini glabri; perulae late ovatae, mucronatae, exteriores circiter 1 cm. longae et latae, rigide chartaceae, brunneae, extra glabrae vel minute ciliolatae, interiores dorso sericeo-pubescentes; ramuli juniores laterales floriferi molliter tomentosi, usque ad 17 cm. longi. *Folia* cum floribus evoluta, ramulis floriferis paullo longiora; petioli communes et petioluli 2·5–4·5 mm. longi molliter tomentosi; foliola 6-juga, opposita vel inferiora subopposita, oblongo-elliptica vel oblongo-ovata, subsensim et acute acuminata, 3·5–8 cm. longa, 1·5–3 cm. lata, juniora membranacea, utrinque breviter pubescentia, obscure reticulata, nervis lateralibus gracilibus utrinsecus circiter 6. *Racemi* penduli, ramulos juniores terminantes, laxiflori; pedicelli graciles, usque ad 3·5 cm. longi, molliter pubescentes; bracteae mox caducae, lineari-spatulatae, caudato-acuminatae, circiter 8 mm. longae, pubescentes. *Calyx* campanulatus, breviter pubescens; tubus 5 mm. longus; lobi triangulari-subulati, circiter 2 mm. longi, pubescentes. *Corolla* alba, circiter 3·5 cm. expansa; vexillum suborbiculare, circiter 2·5 cm. latum, brevissime unguiculatum, ad laminae basin biauriculatum; alae circiter 1·8 cm. longae. *Ovarium* hirtum. *Legumen* (ex *Rehder et Wils.*) compressum, dense velutinum.—*W. brachybotrys*, var. *alba*, Miller in Bailey, Cyc. Am. Hort. p. 1989 (1902). *Milletia floribunda*, var. *brachybotrys*, Matsumura in Tokyo Bot. Mag. vol. xvi. p. 64 (1902); Ind. Pl. Jap. vol. ii. pars 2, p. 270 (1912). *Kraunhia sinensis*, var. *brachybotrys*, forma *albiflora*, Makino in Tokyo Bot. Mag. vol. xxiv. p. 77 (1910). *K. floribunda*, γ *brachybotrys*, forma *albiflora*, Makino in Tokyo Bot. Mag. vol. xxv. p. 18 (1911), fide Rehder et Wils.—J. Hutchinson.

This fine *Wistaria*, Messrs. Rehder and Wilson have pointed out, is readily distinguished among its congeners by the persistent soft and short indumentum of the leaves, by its comparatively short and very wide racemes, its stout spreading velvety pedicels, its large flowers, and its long subulate anterior calyx-teeth. When the number and character of these distinguishing features are considered it seems extraordinary that the right of the Japanese *W. venusta* to be regarded as a species apart has remained so long unrecognised. In addition

to the citations which accompany our description, the authors quoted supply others, which it is needless to repeat here; it is sufficient to remark that it has been confused more than once with the common *W. sinensis*, Sweet, and the not unfamiliar *W. brachybotrys*, Sieb. & Zucc. It was first seen in this country under the latter name, in the Japanese section of the International Horticultural Exhibition held at Chelsea in May, 1912, and in the following year was acquired from a Yokohama nursery for the Kew collection. According to Mr. Wilson, *W. venusta* is cultivated here and there in temple gardens in Japan as the "Shira-fudzi," or White Wistaria; but the colour of the flowers would appear to vary, for a specimen collected by Mr. R. Oldham, "wild on hills near Nagasaki," in 1863, which undoubtedly belongs to this species, is noted by him as having bluish-violet flowers. The plants exhibited in 1912 were shown as shrubs grown in vases; in the Kew collection, however, it thrives quite well in the open, and flowers annually in May and June. It makes a very welcome and beautiful addition to the popular group of hardy flowering climbers and, like other members of the genus, requires a good rich soil and the sunniest position available. The flowers are frequently more or less "double."

Description.—*Shrub*, climbing; final shoots drying purplish-black, glabrous in their second year; bud-scales wide-ovate, mucronate, the outer about $\frac{1}{3}$ in. long and wide, firmly papery, brown, glabrous with finely ciliolate margins, the inner silky-pubescent on the back; young lateral floriferous shoots softly tomentose, up to 7 in. long. *Leaves* appearing along with the flowers, rather longer than the flowering shoots; common rachis and petiolules $\frac{1}{10}$–$\frac{1}{5}$ in. long, softly tomentose; leaflets 6-jugate, opposite or the lower nearly opposite, oblong-elliptic or oblong-ovate, rather gradually and acutely acuminate, $1\frac{2}{3}$–3 in. long, $\frac{2}{3}$–$1\frac{1}{4}$ in. wide, when young membranous, shortly pubescent on both surfaces, faintly reticulate, lateral nerves slender, about six along each side the mid-rib. *Racemes* pendulous at the ends of young twigs, lax-flowered; pedicels slender, up to $1\frac{2}{3}$ in. long, softly pubescent; bracts soon falling, linear-spathulate, caudate acuminate, about $\frac{1}{3}$ in. long, pubescent. *Calyx* campanulate, shortly pubescent; tube $\frac{1}{5}$ in. long; lobes triangular-subulate, about $\frac{1}{12}$ in. long, pubescent. *Corolla* white, about $1\frac{2}{3}$ in. across; standard suborbicular, about 1 in. wide, shortly clawed, 2-auriculate at the base of the blade; wings about $\frac{3}{4}$ in. long. *Ovary* hairy. *Pod* compressed, densely velvety.

Tab. 8811.—Fig. 1, part of a leaf; 2, calyx, stamens and pistil; 3, base of standard, showing the auricles; 4, a wing-petal; 5, a keel-petal; 6, pistil:—*all enlarged.*

M S del J N Fitch lith.

Vincent Brooks Day & Son Lt^d imp

L Reeve & C^o London.

Tab. 8812.

IRIS Reichenbachii.

Macedonia.

Iridaceae. Tribe Moreae.

Iris, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 686.

Iris Reichenbachii, *Heuffel in Verhand. Zool.-Bot. Gesellsch. Wien,* vol. viii. p. 206, *et in Oest. Bot. Zeit.* vol. viii. p. 28; *Petrov. Fl. Nyss.* p. 823; *Velenovsky, Fl. Bulg.* p. 534; *Suppl.* p. 263; *Dykes, Gen. Iris,* p. 151, t. 34; affinis *I. mellitae,* Janka, sed caule plerumque magis elato, spathis paulo brevioribus pro ratione latioribus haud divergentibus et perianthio tubo brevi distincta.

Herba rhizomate digiti crassitudine. *Folia* dense fasciculata, ensata, magis minusve falcata, fasciculorum sterilium demum plerumque ad 12–15 cm. longa et 8–10 mm. lata, interdum vero multo longiora latioraque, caulis florentis breviora, glauco-viridia, laevia. *Caulis* 10–15, rarius ad 25 cm. longus, inferne 1–2-foliatus, apice arcte biflorus. *Spathae* herbaceae, virides, late oblongo- vel elliptico-lanceolatae, acuminatae, acutissime carinatae, 3·5–5 cm. longae. *Pedicellus* brevissimus. *Perigonii* tubus virescens vel superne leviter purpureo-suffusus vel maculatus, 2·5–3 cm. longus, spathis brevior vel eis aequilongus; segmenta exteriora limbo reflexo elliptico vel obovato 3–4 cm. longo, 2–2·5 cm. lato lutescente marginem versus purpureo-suffuso cum barba lutea vel toto luride purpureo cum barba coerulea, ungue late cuneato 2–2·5 cm. longo pallidiore purpureo-venoso; segmenta interiora erecta, lamina obtusa elliptica vel obovata, subito vel rarius sensim in unguem rubro-maculatum contracta, eo incluso 4–6 cm. longa, 2·5–3 cm. lata, eodem colore ac exteriora nisi clariora. *Antherae* filamentis breviores. *Ovarium* oblongum, 1–1·5 cm. longum; styli rami late oblongi, pallide purpurei vel flavescentes, cristae lobis oblique late ovatis dentatis. *Capsula* elliptica, 5·5 cm. longa, sulcis 6 latis obscuris. *Semina* obovata, luteo-fusca.—*I. Reichenbachii* var. *bosniaca,* Beck in Ann. K. K. Naturhist. Hofmus. Wien, vol. ii. p. 51. *I. balkana,* Janka, Adat. Erd. in Mag. Tud. Akad. math. és term. Közl. vol. xii. (1874), p. 173, et in Termez. Füzet. vol. i. part iv. (1877), p. 1 (reimpress.), t. xiv[4]; Bak. in Gard. Chron. 1876, vol. vi. p. 648 pro var.; ibid. 1878, vol. x. p. 266; Velen. Fl. Bulg. 532; Suppl. i. 263; Lynch, Book of Iris, p. 131. *I. Chamaeiris* var. *balkana,* Bak. in Gard. Chron. 1878, vol. x. p. 266. *I. serbica,* Pancic, Fl. Agr. Belgr. ed. iii. p. 206 (1883). *I. bosniaca,* Beck, l.c. vol. v. p. 573 et in Wien. Ill. Gartenzeit. 1895, p. 215, tab. 2; Velen. l.c. p. 535; Suppl. 263. *I. Skorpila,* Velen. Fl. Bulg. p. 535; Suppl. p. 263. *I. Reichenbachiana,* Bak. Handb. Irid. p. 32; Charrel in Oest. Bot. Zeitschr. 1892, p. 410; Lynch, Book of Iris, p. 133 *I. macedonica.* Nadji (Charrel) Emp. Ottom. Pl. Salon. p. 40 (nomen). *I. Athoa,* Foster in Gard. Chron. 1893, vol. xiii. p. 711. *I. Straussii,* Lynch, Book of Iris, p. 129 (partim, teste Dykes).—O. Stapf

Iris Reichenbachii is a native of the Balkan countries from Bosnia, southern Hungary and Serbia, to eastern Rumelia and southern Macedonia. The species was originally described by Heuffel from specimens found in the Hungarian Banat, growing on rocks by the Danube, and from others gathered near Herkulesbad. It may be regarded as the Balkan representative of the more western species *I. Chamaeiris*, Bert., a native of Italy and southern France, from which *I. Reichenbachii* is easily distinguished in the living state by the very acutely keeled herbaceous spathes. While in reality an extremely natural species, *I. Reichenbachii* is at the same time characterised by extraordinary variability in size of plant and colour of flowers. Owing to this variability the plant has at times been misunderstood, hence the unusually long list of synonyms. How pardonable this misunderstanding is will be readily appreciated from an examination of our figure. *I. Reichenbachii* has been in cultivation in the Iris collection at Kew since 1904, when a supply of plants was acquired from Messrs. Haage and Schmidt, Erfurt. Additional plants were presented to Kew by the Hon. N. C. Rothschild in July, 1915; these had been collected on the mountains near Conrova, in Bulgaria. Yet other plants were presented to the national collection by Lady Muriel Herbert in May, 1919; these had come from Salonika. The plate now published has been based, however, on other material; the form with red-purple flowers was received from Miss D. Blanchard, who had flowered it in her garden at Parkstone, Dorset, in May, 1919—her plants having originally been received from Macedonia; the form with greenish-yellow flowers was sent by Lady Muriel Herbert in May, 1917—it was one of her plants from Salonika. At Kew, *I. Reichenbachii* is quite hardy, and has flowered in an open border. It prefers, however, a warm position against a wall. Seeds are only sparingly produced, but it is easily propagated by division of the rootstock, as in most other species of the section to which it belongs.

DESCRIPTION.—*Herb*, with a rootstock $\frac{3}{4}$ in. thick. *Leaves* densely clustered, ensate, more or less falcate, those of the sterile clumps at length usually 5–6 in. long and $\frac{1}{8}$–$\frac{2}{5}$ in. wide, but at times much longer and wider, those of the flowering stem shorter, glaucous-green, smooth. *Stem* 4–6 in., occasionally as much as

10 in. high, 1–2-foliate below, closely 2-flowered at the apex. *Spathes* herbaceous, green, wide oblong-lanceolate or elliptic-lanceolate, acuminate, very acutely keeled, 1½–2 in. long. *Pedicel* very short. *Perianth* with the tube greenish or upwards somewhat flushed or blotched with purple, 1-1¼ in. long, shorter than or at the most equalling the spathes; outer segments with a reflexed elliptic or obovate limb, 1¼–1¾ in. long, ¾–1 in. wide, yellowish but suffused with purple towards the margin and with a yellow crest, or lurid purple throughout and then with a bright blue crest; claw narrowly cuneate, ¾–1 in. long, with rather pale purple veins; inner segments erect, the lamina bluntly elliptic or obovate, suddenly or less often gradually contracted into a red-blotched claw, including the claw 1½–2¼ in. long, 1–1¼ in. wide, of the same colour as the outer segments, but rather more vivid. *Anthers* rather shorter than the filaments. *Ovary* oblong, ⅖–⅗ in. long; style-arms wide oblong, pale purple or yellowish; lobes of the crest obliquely ovate, toothed.

TAB. 8812.—Figs. 1 and 2, stamens; 3, stigma:—*all enlarged.*

M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son Ltd. imp

L. Reeve & Co. London.

Tab. 8813.

DELPHINIUM Pylzowii.

Western China.

Ranunculaceae. Tribe Helleboreae.

Delphinium, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 9.

Delphinium Pylzowii, *Maxim. in Mél. Biol.* fasc. ix. p. 709, *et in Bull. Ac. Pétersb.* vol. xxiii. p. 307; *Fl. Tangut.* p. 21, t. 3; *Regel in Gartenfl.* 1876, p. 289, t. 879; *Huth in Engl. Bot. Jahrb.* vol. xx. p. 408; *Wilson in Gard. Chron.* 1906, vol. xxxix. p. 402; species *D. coeruleo*, Jacquem., persimile, sed petalis superioribus atro-brunneis, lateralibus bifidis distincta.

Herba perennis, e collo tenui pluricaulis, 10–35 cm. alta. *Caules* erecti vel adscendentes, graciles, molliter patule vel subreverse pubescentes vel subvillosi, magis minusve ramosi, ramis longis. *Folia* radicalia caulinis inferioribus similia nisi longius petiolata et minus divisa, haec ambitu subrotundata, circiter 5 cm. diametro, 5-partita, partitionibus late cuneatis parce lobulatis vel superne rhombeo-dilatatis a medio trifidis, segmentis parce laciniatis lacinulis linearibus breviter acutis; folia caulina superiora sensim brevius petiolata, minus divisa. *Flores* azureo-violacei, cum calcare ad 4 vel 5 cm. longi, solitarii vel bini cum quoque ramo, longe pedunculati, pedunculis eodem indumento ac caules nisi superne densiore; bracteae 2, lineares vel lineari-lanceolatae, 3–7 mm. longae, magis minusve a flore remotae. *Sepala* in campanam late apertam conniventia, late elliptica vel elliptico-ovata, obtusa vel obtuso-apiculata, 2–2·5 cm. longa, in dorso laxe pilosa, summum in calcar apice recurvum subacutum pubescens abiens. *Petala* sepalis multo breviora, supra glabra, lamina oblonga oblique truncata 10–12 mm. longa superne atro-brunnea basin versus albescente in calcar glabrum gracile virescens abeunte, lateralia lamina rotundato-obovata circiter 9–10 mm. longa 7 mm. lata ad trientem bifida lobis obtusis basi atro-brunnea caeterum caerulea supra medio aureo-barbata subtus laxe longe flexuoso-pilosa, ungue angusto 9 mm. longo pilosulo. *Filamenta* subulata, superne parce ciliolata; antherae nigrescentes. *Carpella* 5, oblonga, arcte contigua, villosa, 6 mm. longa.—O. Stapf.

The *Delphinium* here figured was first met with in 1872 by Przewalski on the Kansu border, on the mountains just south of the Tetung River. It was first flowered in the Botanic Garden at Petrograd in 1876 from seed communicated by Przewalski, and was named by Maximowicz *D. Pylzowii*, in honour of Przewalski's travelling companion, M. A. Pylzow. Przewalski gathered the species again in 1880 at elevations of 9,000 to 11,000 feet, between Kuku-Nor and the Tetung, and it has since

then been found by Wilson near Sun-tang, in the Si-fan region of north-western Szechuan, as well as by Farrer in Kansu. From Farrer's indication, "On the Eaves of the World," vol. ii. p. 186, his locality is in the Min-Shan range, somewhat to the north-east of Wilson's collecting ground. Our figure has been prepared from a plant presented to Kew by Mr. Farrer in June, 1917. Of two plants then received, one was grown in the Rock Garden, the other kept in a pot in a cold frame. The species has proved to be a hardy perennial, both plants flowering in May, 1918, when our drawing was made. Both plants produced good seed, and survived the winter following; both flowered again in May, 1919. The conditions most suitable for *D. Pylzowii* are those needed for the well-known *D. grandiflorum*, Linn. Although the dark azure-violet shown in our illustration appears to be the normal colour of the flower, Maximowicz records the existence of a form with pale rose or rose-lilac blossoms.

DESCRIPTION.—*Herb*, perennial with several stems, 4–14 in. high, rising from a slender crown; stems slender, erect or ascending, softly pubescent or almost villous with spreading or somewhat deflexed hairs, more or less branched, the branches long. *Leaves* pedately lobed, the radical like the lower cauline, but with longer petioles and less deeply divided, somewhat rounded in outline, about 2 in. across, 5-partite, the main-lobes wide cuneate and sparingly lobulate or upwards rhomboidly expanded and 3-fid to the middle, segments sparingly laciniate with the ultimate lobules linear abruptly acute; upper cauline leaves with gradually shortened petioles and less divided blades. *Flowers* azure-violet, with a spur $1\frac{3}{4}$–2 in. long, solitary or paired on each branch, long peduncled; peduncles hairy like the stem, but more densely so upwards; bracts 2, linear or linear-lanceolate, $\frac{1}{8}$–$\frac{1}{4}$ in. long, somewhat distant from their flowers. *Sepals* connivent in a wide open bell, wide-elliptic or elliptic-ovate, obtuse or bluntly apiculate, $\frac{3}{4}$–1 in. long, loosely pilose on the back, the uppermost produced into a pubescent spur with a recurved rather acute tip. *Petals* much shorter than the sepals, glabrous above, lamina oblong obliquely truncate, about $\frac{1}{2}$ in. long, upwards brownish-black, nearly white towards the base, passing into a glabrous, slender, greenish spur; the lateral with a rounded-ovate lamina, about $\frac{1}{3}$ in. long, $\frac{1}{4}$ in. across, 2-fid to the middle with obtuse lobes, blackish-brown at the base, elsewhere blue with a golden beard in the middle above, beneath loosely pilose with long flexuous hairs; claw narrow, somewhat pilose, $\frac{1}{3}$ in. long. *Filaments* subulate, sparingly ciliolate above; anthers blackish. *Carpels* 5, oblong, close-set, villous, $\frac{1}{4}$ in. long.

TAB. 8813.—Fig. 1, portion of a leaf; 2, a flower, the sepals removed; 3, stamens; 4, pistil:—*all enlarged*.

M S del J N Fitch lith

Vincent Brooks, Day & Son Lt.d imp.

L Reeve & Co London

Tab. 8814.

MESEMBRYANTHEMUM NOBILE.

South Africa.

Ficoideae. Tribe Mesembryeae.

Mesembryanthemum, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 853.

Mesembryanthemum (§ Magnipuncta) **nobile**, *Haw. in Phil. Mag.* vol. lxii. (1823), p. 381; *DC. Prodr.* vol. iii. p. 419; *Salm-Dyck, Mesemb.* fasc. iv. t. 1; *Harv. & Sond. Fl. Cap.* vol. ii. p. 396; *Berger, Mesemb.* pp. 263, 264, fig. 56; species *M. magnipunctato*, Haw., valde affinis, foliis angustioribus subfalcatis et magis glaucescentibus differt.

Herba parva, acaulis. *Folia* 4–6, basi connata, patentia vel subrecurva, oblonga, subobtusa, crassa, supra planiuscula, subtus subtriquetra, 4–6 cm. longa, 1·3–1·5 cm. lata, glaucescentia, crebre viridi-punctata. *Flores* subsessiles, speciosi, 5–6 cm. diametro. *Pedunculi* subobsoleti, crassi, bracteis duabus carnosis subfoliaceis instructi. *Calyx* subglobosus, circiter 2 cm. longus, 5–6-fidus; lobi lanceolato-oblongi, subobtusi, carnosi. *Petala* pluriserialia, linearia, aurea, 2·5–3 cm. longa. *Stamina* numerosa; antherae oblongae. *Ovarium* subglobosum, supra conicum, verruculosum; styli circiter 16, erecti, subulati, facie plumulosi.—*M. magnipunctatum*, var. *affine*, Haw. Revis. Pl. Succ. p. 87.—R. A. Rolfe.

The section *Magnipuncta*, recognised by Haworth within the large and polymorphic genus *Mesembryanthemum*, includes only two forms, the original *M. magnipunctatum*, Haw., and the one now figured, which Haworth at first was inclined to regard as only a variety of *M. magnipunctatum*, but at a later date treated as a distinct species, *M. nobile*. The original *M. magnipunctatum* was based on a plant collected by Burchell and cultivated at Kew nearly a century ago. There is a coloured drawing in the Herbarium collection of a flowerless example which was collected on the heights near the Zekoe River by Bowie in 1818. When Haworth indicated the existence of the variety *nobile*, he tentatively referred to that variety the plant regarded by Prince Salm-Dyck as *M. magnipunctatum*, and this plant became the type of *M. nobile*, Haw., in 1823. There is at Kew a coloured drawing of Haworth's second species which is noted as having been received from Prince Salm-Dyck. The

plant shown in that drawing is again without blossom, but the species was afterwards figured in Salm-Dyck's monograph. Salm-Dyck obtained his plant in 1814 from Vienna. Since then *M. nobile* has been collected at the Gamka River, Prince Albert Division, Cape Colony, by Zeyher, and, according to Berger, it has also been met with by Marloth in the adjacent Beaufort West Division. Plants both of *M. magnipunctatum* and *M. nobile* were presented to Kew in 1916 by Mr. Cecil Hanbury, from the La Mortola collection, and the figure of the latter now given has been prepared from the La Mortola example, which agrees well in its essential characters with those of Bowie and Salm-Dyck. The differences between the two allied species are well shown by the examples of each now grown at Kew, where they thrive well and flower in summer in a green-house.

DESCRIPTION.—*Herb*, small and stemless. *Leaves* 4–6, connate at the base, spreading or slightly recurved, oblong, rather blunt, thick, flattish above, slightly angled beneath, $1\frac{3}{4}$–$2\frac{1}{4}$ in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. wide, glaucescent, closely dotted with green spots. *Flowers* almost sessile, showy, 2–$2\frac{1}{4}$ in. across. *Peduncles* nearly obsolete, thick, with two fleshy bracts resembling the leaves. *Calyx* nearly globose, about $\frac{3}{4}$ in. long, 5–6-lobed; lobes lanceolate-oblong, rather blunt, fleshy. *Petals* several-seriate, linear, golden-yellow, 1–$1\frac{1}{4}$ in. long. *Stamens* many; anthers oblong. *Ovary* nearly globose, conical upwards, finely verrucose; styles about 16, erect, subulate, slightly plumose on the face.

TAB. 8814.—Fig. 1, stamen, seen from in front; 2, the same, seen from behind; 3, apex of the ovary, with styles; 4, a stigma:—*all enlarged*.

4

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6

3

2

1

M S del J N Fitch lith.

Vincent Brooks, Day & Son Lt^d imp.

L. Reeve & C^o London.

TAB. 8815.

RHODODENDRON DICHROANTHUM.

Yunnan.

ERICACEAE. Tribe RHODOREAE.

RHODODENDRON, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Rhododendron dichroanthum, *Diels in Notes Roy. Bot. Gard. Edinb.* vol. vii. p. 212 (1912); *Millais, Rhododendrons*, p. 155 (1917); affinis *R. neriiflora*, Franch., sed foliis infra indumento furfuraceo albido ornatis, filamentis inferne puberulis differt.

Frutex sempervirens; ramuli annotini glabrescentes, circiter 4 mm. crassi, cortice pallide brunneo obtecti, hornotini dense albo-arachnoidei. *Folia* matura oblongo-oblanceolata, basi angustata, ad apicem mucronatum rotundata, 6–8 cm. longa, 2–3 cm. lata, rigide chartacea, supra glabra et impresse reticulata (juniora tenuiter arachnoidea), infra indumento fere albo furfuraceo induta; costa supra impressa, infra prominens, glabra; nervi laterales utrinsecus 6–8, supra leviter impressi, infra prominuli marginem versus evanidi, a costa sub angulo 45° abeuntes; petioli circiter 1 cm. longi, fere glabri, supra canaliculati. *Inflorescentia* brevissime racemoso-umbellata, laxe 5–7-flora; axis 0·5 cm. longa, glabra; pedicelli demum nutantes, 1·5–2 cm. longi, crispato-puberuli. *Calyx* coloratus, polymorphus, usque ad 2·5 cm. longus, fere ad basin 5-lobatus, lobis imbricatis apice rotundatis glabris vel interdum brevissimis et parce ciliolatis. *Corolla* purpureo-rubra, late tubulosa, 5-lobata; tubus 3–3·5 cm. longus, apice circiter 2 cm. diametro, intra basin saccato-lobulatus, glaber; lobi patulo-recurvati, breves, emarginati. *Stamina* 10, corollae tubo aequilonga; filamenta basin versus parce puberula; antherae 2·25 mm. longae, atro-purpureae. *Ovarium* 6-loculare, tomentosum; stylus breviter exsertus, glaber, stigmate parvo coronatus. *Capsula* haud visa.—J. HUTCHINSON.

The material for the accompanying figure of *Rhododendron dichroanthum* we owe to the courtesy of Mr. J. C. Williams, in whose collection at Caerhays it flowered in May, 1918. The species is one discovered by Mr. G. Forrest in July, 1906, at altitudes of from 9,000 to 11,000 feet above the sea, in shady situations of the open country on the eastern flank of the Tali Range, in western Yunnan, in 25° 40′ N. Lat. Of two distinct gatherings of the species obtained in 1906 Forrest describes the corollas as being creamy rose or yellowish rose. The plant now figured had, however, purplish-red flowers, and Mr. Millais records the corolla of this species

as being very variable in colour. Mr. Williams says with regard to this Rhododendron that perhaps sufficient is not yet known as to the most suitable situation, but in cases where a choice is possible it would be preferable, judging from its behaviour under conditions to which it has already been subjected, to select a cool damp slope with no overhead shade, with an eastern aspect or one even to the north of east, but with at the same time shelter from wind. *R. dichroanthum* is closely allied to *R. neriiflorum*, Franch., figured at t. 8727 of this work, but is readily distinguished by the mealy hairy covering on the under surface of the leaves and by the puberulous filaments. Both species are remarkable for the presence of large outgrowths within the base of the corolla-tube.

DESCRIPTION.—*Shrub*, evergreen; year-old twigs glabrescent, about $\frac{1}{6}$ in. thick, with pale brown bark; young shoots closely covered with a webbed white tomentum. *Leaves* when mature oblong-lanceolate, narrowed at the base, mucronate and rounded at the tip, $2\frac{1}{4}$–3 in. long, $\frac{3}{4}$–$1\frac{1}{4}$ in. wide, firmly papery, glabrous above and reticulate with sunk venation (young leaves with a thin webbed tomentum), beneath clothed with a nearly white scurfy tomentum; mid-rib sunk above, raised beneath, glabrous; lateral nerves from 6–8 on each side of the mid-rib, slightly sunk above and raised beneath, disappearing towards the leaf-margin and leaving the mid-rib at an angle of 45°; petiole about $\frac{1}{3}$ in. long, nearly glabrous, channelled above. *Inflorescence* shortly umbellately racemose, loosely 5–7-flowered; axis $\frac{1}{5}$ in. long, glabrous; pedicels ultimately nodding, $\frac{2}{3}$–$\frac{3}{4}$ in. long, crisply puberulous. *Calyx* brightly coloured, variable in shape, sometimes as much as 1 in. long, 5-lobed nearly to the base, lobes imbricate, rounded at the tip, glabrous or at times shortly and sparingly ciliolate. *Corolla* purplish-red, wide tubular, 5-lobed; tube $1\frac{1}{4}$–$1\frac{2}{3}$ in. long; about $\frac{3}{4}$ in. wide at the mouth, saccate-lobulate at the base within, glabrous; lobes spreading or recurved, short, emarginate. *Stamens* 10, as long as the corolla-tube; filaments sparingly puberulous towards the base; anthers about $\frac{1}{10}$ in. long, blackish-purple. *Ovary* 6-celled, tomentose; style shortly exserted, glabrous, tipped by the small stigma. *Capsules* not yet seen.

TAB. 8815.—Fig. 1, part of a leaf; 2, calyx and pistil; 3, part of corolla seen from within; 4, stamen; 5, anther; 6, ovary:—*all enlarged*.

M.S.del. J.N.Fitch.lith

Vincent Brooks, Day & Son Ltd imp

L. Reeve & Co. London

Tab. 8816.

PRIMULA chionantha.

Yunnan.

Primulaceae. Tribe Primuleae.

Primula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 631.

Primula chionantha, *Balf. f. et Forrest in Notes Roy. Bot. Gard. Edinb.* vol. ix. p. 11 (1915); affinis *P. nivali,* Pallas, sed habitu majore, floribus albidis verticillatim dispositis differt.

Herba robusta, farinosa, 3·5–7 dm. alta. *Folia* obovato-oblanceolata vel oblongo-elliptica, obtusa, basi in petiolum alatum nervosum attenuata, usque ad 25 cm. longa et 5 cm. lata, satis crassa, minutissime repando-denticulata, epilosa, infra sulphureo-farinosa; nervi laterales adscendentes, utrinsecus circiter 10, sicco infra prominuli; petioli usque ad 4 cm. longi, demum submembranacei. *Scapus* robustus, plus minusve sulphureo-farinosus, umbellam plurifloram et verticillos inferos 2–3 gerens. *Flores* albi; pedicelli inaequales, usque ad 4·5 cm. longi, patuli vel suberecti, apicem versus dense sulphureo-farinosi; bracteae triangulari-lineares, subacutae, usque ad 1 cm. longae, extra parce intus dense farinosae. *Calyx* cylindrico-campanulatus, extra parce farinosus; tubus 3 mm. longus, lobis 5 lanceolatis subobtusis 4–5 mm. longis basi 1·5–2 mm. latis intra densissime farinosis. *Corollae* tubus usque ad 1·2 cm. longus, supra stamina ampliatus, glaber, limbo ad 3 cm. expanso, lobis ellipticis vel ovatis circiter 1 cm. longis. *Antherae* in flore brevistylo supra medium tubi insertae, 2·5 mm. longae. *Stylus* brevis corollae tubo triente brevior, stigmate magno capitato coronatus. *Capsula* pallida, cylindrica, 1·5 cm. longa, apice in valvis 5 dehiscens, basi calyce accrescente cincta. *Semina* circiter 1 mm. longa, testa spongiosa.—J. Hutchinson.

The very handsome *Primula* here described is one of the discoveries of Mr. G. Forrest, by whom it was first collected in July, 1913, on the Chungtien plateau in Yunnan, 27° 55′ N. Lat., at about 12,000 to 13,000 feet above sea-level, where it grows in open Alpine meadows. Seeds of *P. chionantha* were presented to Kew by Mr. J. C. Williams, of Caerhays Castle, Cornwall, in April, 1915, from the fruits of Mr. Forrest's collection of 1914 on the Mekong-Salwin divide, also in Yunnan. Seedlings were raised and planted in the Rock Garden at Kew, where they flowered in May, 1917, when our figure was prepared. The species has proved perfectly hardy at Kew, but, like all those belonging to the same

group, died after flowering. Abundant good seed was, however, produced, and from this a further stock of plants has been raised. *P. chionantha* thrives best in a shady situation in moist rich soil. The species is compared by Professor Balfour with the Oriental and North Asian *P. nivalis*, Pallas. It differs from *P. nivalis* mainly in its nearly entire leaves, its constantly verticillate inflorescence, and its shorter calyx. It is also taller and more robust in habit.

Description.—*Herb*, stout and mealy, 14–28 in. high. *Leaves* obovate-oblanceolate or oblong-elliptic, blunt, narrowed at the base into a veined winged petiole, up to 10 in. long and 2 in. wide, rather stout, finely repand-denticulate, without hairs, but sulphur-mealy on the under surface; lateral nerves ascending, about ten on each side of the mid-rib, when dry raised beneath; petiole up to $1\frac{1}{2}$ in. long, at length rather membranous. *Scape* stout, more or less sulphur-mealy, bearing an apical many-flowered umbel with 2–3 many-flowered verticels lower down. *Flowers* white; pedicels of unequal length, the longest $1\frac{3}{4}$ in. long, spreading or nearly erect, densely sulphur-mealy towards the top; bracts triangular-linear, somewhat acute, about $\frac{1}{3}$ in. long, sparingly mealy outside, more densely so within. *Calyx* cylindric-campanulate, sparingly mealy outside; tube $\frac{1}{8}$ in. long; lobes 5, lanceolate, rather blunt, $\frac{1}{6}$–$\frac{1}{5}$ in. long, about $\frac{1}{12}$ in. wide at the base, densely mealy within. *Corolla* glabrous; tube $\frac{1}{2}$ in. long, enlarged above the staminal insertion; limb $1\frac{1}{4}$ in. wide, the lobes elliptic or ovate, about $\frac{2}{5}$ in. long. *Anthers* in the short-styled flowers attached above the middle of the tube, $\frac{1}{10}$ in. long. *Style* short, less than one-third the length of the corolla-tube, crowned by the large capitate stigma. *Capsule* cylindric, $\frac{3}{5}$ in. long, opening by 5 apical valves, surrounded below by the accrescent calyx. *Seeds* very small; testa spongy.

Tab. 8816.—Fig. 1, calyx and pistil: 2, corolla in vertical section, showing stamens; 3, pistil; 4, capsule:—*all enlarged, except* 4, *which is of natural size.*

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3

2

M.S. del. J.N. Fitch. lith.

Vincent Brooks, Day & Son Lt^d imp

L. Reeve & C^o London

Tab. 8817.

BRACHYSTELMA FOETIDUM

South Africa.

Asclepiadaceae. Tribe Ceropegieae.

Brachystelma, *R.Br.; Benth. et Hook. f. Gen. Plant.* vol. ii. p. 781.

Brachystelma foetidum, *Schlechter in Engl. Jahrb.* vol. xx. Beibl. 51, p. 52 *et in Journ. Bot.* 1897, p. 292; *N. E. Brown in Dyer, Fl. Cap.* vol. iv. sect. 1, p. 840; species *B. crispo*, Grah. et *B. tuberoso*, R.Br. affinis, sed ab illa corollae lobis brevioribus glabris vel rarius ad faciem interiorem puberulis, ab hac corollae lobis multo longioribus differt.

Herba perennis caudice tuberoso. *Tuber* complanatus, usque ad 13 cm. diametro. *Caules* solitarii vel plures, adscendentes vel patentes, ramosi, 7–15 cm. longi, pilis brevibus patentibus vestiti. *Folia* opposita, patentia, lineari-lanceolata, lanceolata vel elliptica, rarius obovata, apice acuta vel obtusa, margine interdum undulata, basi in petiolum brevem angustata, utrinque villosa vel supra glabra, 1–5 cm. longa, 3–16 mm. lata. *Flores* axillares, solitarii vel saepius in fasciculis 2-6–floris dispositi, foetidissimi. *Pedicelli* 5–8 mm. longi, pubescentes. *Sepala* lanceolata, acuta, 3–5 longa, pubescentia. *Corolla* 2·5–5 cm. diametro, extra pubescens vel subglabrescens, intus glabra vel rarius puberula, atropurpurea et lutea, lobis superne viridescentibus tubo verruculis fuscis notato; tubus campanulatus, 6–8 mm. longus; lobi liberi, patentes, lineares vel lanceolati e basi deltoidea, acuti, 1–2·5 cm. longi, 1–1·5 mm. lati, breviter ciliati. *Corona exterior* cupuliformis, columnam staminalem subaequans, 10-dentata, saccula antheris alternantia formans; dentes erecti, deltoidei, vix 1 mm. longi. *Coronae interioris* lobi lineares, obtusi, usque ad 1 mm. longi, ad dorsa antherarum incumbentes. *Folliculi* geminati vel solitarii, tereti-fusiformes, obtuse rostrati, pubescentes, 6–8 cm. longi, 6–8 mm. crassi.—*B. Rehmanii*, Schlechter in Bull. Herb. Boiss. vol. iv. p. 449.—S. A. Skan.

This *Brachystelma* was first discovered near the Mooi River, Transvaal, by Joseph Burke, some time between 1840 and 1842. It has since been collected in several other localities in the Transvaal, also in the Orange River Colony, Basutoland and Zululand. Tubers of the plant, collected near Pretoria, were sent to Kew in January, 1917, by Mr. A. M. Bottomley of the Division of Botany, Pretoria, and from one of these the material for the figure was obtained in the following May. It is an interesting and curious plant, but scarcely ornamental, and its flowers, as is often the case in the family, have a very disagreeable odour. The tubers are eaten by the natives,

and are known as Hottentot's bread ; in the raw state they have a bitter taste. Several species of *Brachystelma* are, or have been, in cultivation ; these include *B. tuberosum*, R. Br. (t. 2343), *B. crispum*, Grah. (t. 3016), *B. Barberiae*, Harv. (t. 5607), and *B. oianthum*, Schlechter (t. 8670), which have been figured in this Magazine. The genus comprises about seventy-four species, of which forty-five are natives of South Africa, and nineteen of Tropical Africa ; there are several in India, one in Siam, and one in New Guinea. At Kew *B. foetidum* is cultivated in a dry tropical house devoted to succulent plants, where it flowered for the first time in August, 1918, when the figure now given was prepared.

Description.—*Herb* with a perennial tuberous rootstock. *Tuber* flattened, up to 5 in. across. *Stems* solitary or several, ascending or spreading, branched, 3–6 in. long, clothed with short spreading hairs. *Leaves* opposite, spreading, linear-lanceolate, lanceolate or elliptic, rarely obovate, tip acute or obtuse, margin sometimes undulate, narrowed at the base into a short petiole, villous on both surfaces or glabrous above, $\frac{1}{3}$–2 in. long, $\frac{1}{8}$–$\frac{3}{5}$ in. wide. *Flowers* axillary, solitary or often in clusters of 2–6, odour very disagreeable. *Pedicels* $\frac{1}{5}$–$\frac{1}{3}$ in. long, pubescent. *Sepals* lanceolate, acute, $\frac{1}{8}$–$\frac{1}{5}$ in. long, pubescent. *Corolla* 1–2 in. across, pubescent to nearly glabrous outside, glabrous or rarely puberulous within, limb dark-purple and yellow with the lobes greenish upwards, and the tube beset with tawny minute warts ; tube campanulate, $\frac{1}{4}$–$\frac{1}{3}$ in. long ; lobes free, spreading, linear or lanceolate from a deltoid base, acute, $\frac{2}{5}$–1 in. long, $\frac{1}{24}$–$\frac{1}{16}$ in. wide, shortly ciliate. *Outer corona* cup-shaped, about as long as the staminal column, 10-toothed, so as to form small sacs alternating with the anthers ; the teeth themselves erect, deltoid, very short. *Inner corona* with linear, blunt, very short lobes incumbent on the backs of the anthers. *Follicles* geminate or solitary, fusiform-terete, bluntly beaked, pubescent, $2\frac{1}{4}$–$3\frac{1}{4}$ in. long, $\frac{1}{4}$–$\frac{1}{3}$ in. wide.

Tab. 8817.—Fig. 1, flower-bud ; 2, corona and gynostegium ; 3, pollinia :—*all enlarged.*

M.S del J.N Fitch lith.

Vincent Brooks Day & Son Lith.

L Reeve & Co London

Tab. 8818.

CRATAEGUS Wattiana.

Baluchistan ; Central Asia.

Rosaceae. Tribe Pomeae.

Crataegus, *Linn. ; Benth. et Hook. f. Gen. Plant.* vol. i. p. 626.

Crataegus Wattiana, *Hemsl. et Lace in Journ. Linn. Soc.* vol. xviii. p. 323 (1891), t. 40 ; *Rehder in Bailey, Stand. Cyclop. Hort.* vol. ii. p. 889 ; species *C. sanguineae,* Pall., proxime accedens, foliis glabris nunquam pubescentibus truncatis vel subcordatis nunquam cuneatis, ovario apice glabro apte distinguenda.

Arbor parva, 5–6-metralis, coma laxa, patula ; cortex desquamans ; ramuli hornotini intense brunneo-purpurei, nitidi, glabri ; gemmae obtusae, rotundatae, nitidae, intenso brunneae. *Folia* decidua, ramulorum florigerum late ovata, ramulorum sterilium triangularia, 3·7–10 cm. longa, 3·5–8 cm. lata, apice acuta, basi late cuneata, truncata vel nonnunquam subcordata, margine utrinsecus 3–5-lobata vel -partita lobis inaequaliter serratis, glabra, supra saturate viridia subtus pallidiora ; petiolus 1·8–2·8 cm. longus. *Stipulae* arcuatae, semi-cordatae, 1·2–2·5 cm. longae, foliaceae, alte serratae. *Corymbi* ramulos abbreviatos foliatos terminantes, 5–7·5 cm. lati, multiflori ; flores albi, 1·2 cm. lati, aestate ineunti aperti ; pedicelli glabri. *Calyx* 5-lobus ; tubus urceolatus ; lobi triangulari-ovati, acuminati, glabri, tubo breviores, post anthesin reflexi. *Petala* alba, orbicularia, 6 mm. lata. *Stamina* 18–20 ; filamenta glabra ; antherae pallide luteae. *Ovarium* apice glabrum ; styli saepissime 5, glabri. *Fructus* globosus, 1·2 cm. diametro, pellucidus, carnosus, luteus ; pyrenes saepissime 5, securiformes, 5 mm. longae.—*C. altaica,* Lange in Rev. Sp. Gen. Crat. p. 42, t. 5 ; C. K. Schneider, Handb. Laubholzk. vol. i. p. 773 ; Bean in Trees and Shrubs Brit. Isles, vol. i. p. 420.—W. J. Bean.

Crataegus Wattiana belongs to Zabel's section *Sanguineae,* a group of Central and North Asiatic thorns characterised by dark shining purplish-brown young shoots, and a calyx whose lobes are entire and shorter than the tube. It is closely allied to *C. sanguinea,* Pall., with the yellow-fruited form of which it has been confused. The material for our figure was gathered from a tree purchased in 1900 from a continental nursery under the name "C. sanguinea, var. xanthocarpa." The forms of *C. sanguinea* are, however, to be distinguished by the invariably cuneate base of the leaf, the more or less pubescent foliage, and the pilose summit of the ovary. In *C. Wattiana* the leaves, especially on the barren

twigs, are often truncate or even slightly cordate, the foliage is perfectly glabrous, as is also the summit of the ovary. The type specimen of *C. Wattiana* in the Kew Herbarium was collected by Mr. J. H. Lace in 1888 in the Urak Gorge, Baluchistan, at 7,200 feet, and it was named three years later by Messrs. Hemsley and Lace in their paper on the vegetation of that country, published in the Journal of the Linnean Society. The name "altaica" first appeared in 1838 in Loudon's "Arboretum et Fruticetum Britannicum" (vol. ii. p. 823), where it is quoted as "C. altaica, Ledebour in Loddiges' Catalogue," and reduced to *C. purpurea*, var. *altaica*. In 1897 the name was taken up by Lange in the work cited above, but it is doubtful whether his plant and the one now figured be identical with that mentioned by Loudon as growing in the nursery of Messrs. Loddiges at Hackney in 1837. Even assuming its validity, Lange's name is superseded by Hemsley and Lace's older one. The greatest beauty of *C. Wattiana* is in August, when its fruits become ripe and acquire that clear and remarkably translucent yellow colour which makes them so distinct from the fruits of any other Crataegus we cultivate. The flesh is soft, and when once fully ripe the haws soon begin to fall from the branches. The tree at Kew is fifteen feet in height.

DESCRIPTION.—*Tree*, probably not exceeding 20 ft. in height when full-grown, unarmed, with a lax spreading head of branches; bark of trunk peeling; young twigs dark brownish-purple, shining, glabrous; winter-buds blunt and rounded, dark shining brown. *Leaves* deciduous, broadly ovate on the fertile shoots, triangular on the barren ones; 1½–4 in. long, 1¼–3¼ in. wide; apex acute, base broadly cuneate to truncate, margins with 3–5 pointed lobes at each side, sinuses occasionally reaching nearly to the mid-rib; petiole ¾–1⅛ in. long. *Stipules* arcuate, semi-cordate, ½–1 in. long, foliaceous, jagged-serrate. *Corymbs* terminal on short leafy twigs, 2–3 in. across, many-flowered, each flower about ½ in. wide, white, opening in May; pedicels glabrous. *Calyx* with an urceolate tube and 5 triangular-ovate acuminate glabrous lobes, shorter than the tube, reflexed after pollination. *Petals* white, orbicular, ¼ in. wide. *Stamens* 18–20; filaments glabrous; anthers pale yellow. *Ovary* glabrous at the summit; styles usually 5, glabrous. *Fruit* globose, ½ in. wide, clear translucent yellow; flesh soft; pyrenes usually 5, hatchet-shaped, ⅓ in. long.

TAB. 8818.—Fig. 1, flower-bud; 2, flower in vertical section, the petals removed; 3 and 4, stamens:—*all enlarged*.

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Tab. 8819.

BAIKIAEA insignis.

Tropical West Africa.

Leguminosae. Tribe Amherstieae.

Baikiaea, *Benth. in Benth. et Hook. f. Gen. Plant.* vol. i. p. 581.

Baikiaea insignis, *Benth. in Trans. Linn. Soc.* vol. xxv. p. 314, t. 41 (1865); *Oliv. Fl. Trop. Afr.* vol. ii. p. 309 (1871); *Gard. Chron.* 1918, vol. lxiv. p. 56; species foliolis acuminatis floribus speciosissimis insignis.

Arbor 10–13 m. alta (teste *Mann*); ramuli flexuosi, fere glabri, crebre lenticellati. *Foliola* 3, 4 vel 5, alterna vel subopposita, oblique oblongo-elliptica, sensim acuminata, subobtusa, basi obtusa uno latere umbonato-incrassata, 12–30 cm. longa, 4–8 cm. lata, integra, coriacea, utrinque crebre reticulata, infra nitidula; costa media supra plana, infra prominens; nervi laterales numerosi, inconspicui; petioluli incrassati, usque ad 1 cm. longi, transverse rugosi; stipulae parvae, ovato-lanceolatae, squamiformes. *Flores* maximi, pauci, nutantes, ad apices ramorum conferti, alabastro dense fusco-velutini; bracteae et bracteolae late ovatae, concavae, 3–4 mm. longae, mox deciduae; pedicelli robusti, usque ad 2 cm. longi, velutini. *Calycis* tubus crassus, turbinatus, circiter 1 cm. longus; segmenta anguste imbricata, linearia, usque ad 11 cm. longa, extra brunneo-velutina, intus adpresse sericeo-pilosa, sub anthesin recurvata. *Petala* usque ad 20 cm. longa, obovata, basi in unguem longe attenuata, utrinque medium versus laxe pilosa, dorsale intra aurantiaco, cetera alba, conspicue nervosa. *Stamina* 10, exserta; filamenta inferne inaequaliter connata, medio et infra pubescentia; antherae curvatae, 1·2 cm. longae. *Ovarium* longe stipitatum, circiter 8-ovulatum, dense villosum; stylus 5 cm. longus, glaber, gracilis, stigmate depresso-globoso coronatus. *Fructus* immaturus curvatus, circiter 18 cm. longus et 4·5 cm. latus, transverse rugosus, minute velutinus.—J. Hutchinson.

The genus *Baikiaea* was named in honour of the late Dr. William Balfour Baikie, of the Naval Medical Service, who was surgeon to the Niger Expedition of 1854 and did much to further our acquaintance with the vegetation of West Africa. The species now figured was first collected by the late Mr. G. Mann in the island of Fernando Po in 1863, and described by Mr. Bentham as *B. insignis* in 1865; it has since then been met with on the African continent in Lagos, the Cameroons, and the French Gaboon. There is a closely allied species, *B. minor*,

Oliv., which occurs in the Cameroons, the Congo State and Uganda, with smaller flowers and obtuse emarginate leaves. Other species, with much more numerous and quite small leaflets and flowers, are to be found in Angola and in the Zambesi basin. The flowers of *B. insignis* are probably the largest known in the suborder *Caesalpinieae* of the family *Leguminosae*. The dorsal petal is distinctly coloured and exhibits the additional peculiarity of embracing the tenth, and quite free, stamen which it thus keeps apart from the remaining connate stamens, perhaps at a suitable time opening a door whereby birds or insects may obtain access to the nectaries. The plant whence the material for our figure has been obtained was received at Kew in 1894 from the Botanical Station, Lagos. It flowed for the first time in a tropical house in July, 1914. Planted in a border in this house it has grown to a height of thirty feet, and in July, 1918, it flowered more profusely than in previous years. The flowers are extremely fugacious and in size, texture and colour recall those of *Camoensia maxima*, figured at t. 7572 of this work, save that the yellow colour in the latter case, instead of being confined to the dorsal petal, occurs as a marginal line on every petal.

Description.—*Tree*, 35–45 ft. high; twigs flexuous, almost glabrous, closely lenticelled. *Leaflets* 3 or 4 or 5, alternate or nearly opposite, obliquely oblong-elliptic, gradually acuminate and somewhat blunt at the tip, base rounded and umbonately thickened on one side, 5–12 in. long, $1\frac{3}{4}$–$3\frac{1}{4}$ in. wide, entire, coriaceous, closely reticulate on both surfaces, rather shining beneath; midrib flat above, raised beneath; lateral nerves many, indistinct; petiolules thickened, about $\frac{1}{3}$ in. long, wrinkled transversely; stipules small, ovate-lanceolate, scale-like. *Flowers* very large, few, nodding, clustered at the tips of the twigs, densely velvety in bud; bracts and bracteoles wide-ovate, concave, $\frac{1}{8}$–$\frac{1}{6}$ in. long, soon deciduous; pedicels stout, up to $\frac{3}{4}$ in. long, velvety. *Calyx-tube* thick, turbinate, about $\frac{1}{3}$ in. long; segments slightly imbricate, linear, up to $4\frac{1}{4}$ in. long, brown velvety outside, adpressed silky, recurved when the flowers open. *Petals* up to 8 in. long, obovate, narrowed at the base to a distinct claw, laxly hairy about the middle on both sides, the upper petal yellow within, the others white, with conspicuous veins. *Stamens* 10, exserted; upper filament free, the others unequally connate below, pubescent from the middle downwards; anthers curved, $\frac{1}{2}$ in. long. *Ovary* long-stipitate, about 8-ovuled, densely villous; style 2 in. long, glabrous, slender, crowned by the depressed-globose stigma. *Fruit* (not fully ripe) curved, about 7 in. long and $1\frac{3}{4}$ in. wide, transversely rugose, finely velvety.

Tab. 8819.—Fig. 1, petiolule and base of leaflet; 2, stamens; 3 and 4, anthers; 5, pistil:—*all enlarged.*

5

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M.S del. J.N.Fitch lith.

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Tab. 8820.

ATRAPHAXIS Billardieri.

Greece and the Levant.

Polygonaceae. Tribe Eupolygoneae.

Atraphaxis, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 96.

Atraphaxis Billardieri, *Jaub. et Spach, Ill. Pl. Or.* vol. ii. p. 14, t. 111; *Meisn. in DC. Prodr.* vol. xiv. p. 77; *Boiss. Fl. Or.* vol. iv. p. 1022; *Post, Fl. Syr. Palest. et Sinai*, p. 700; *Halácsy, Consp. Fl. Graec.* vol. iii. p. 69; *C. Schneider, Handb. Laubholzk.* vol. i. p. 255; affinis *A. Tournefortii*, Jaub. et Spach, sed ramulis sterilibus demum saepe spinescentibus, foliis multo minoribus, basi plerumque magis abrupte attenuatis, perianthii segmentis exterioribus pedicelli parte supranodali brevioribus vel eam aequantibus differt.

Frutex 0·5–0·75 m. altus, magis minusve squarrosus, ramis sterilibus demum saepe spinescentibus novellis minute puberulis cortice vetusto griseo-brunneo vel griseo. *Folia* viridia, glabra, breviter petiolata, ad petioli basin articulata; lamina ambitu variabili, ab ovato-obtuso (folia inferiora) ad ovato-lanceolatum vel lanceolatum acutum mutata, 3–5 mm. longa, crassiuscula, reticulato-venosa, margine subundulata, ochreae internodiis demum breviores, dente utrinque subulato hyalino longiusculo. *Racemi* densiusculi, ad 8-flori in ramulis brevibus foliatis, pedicelli juxta medium articulati, 6–8 mm. longi, pertenues. *Perianthii* segmenta demum valde aucta, rosea nisi medio virescentia, 2 exteriora late elliptica, reflexa, fere ad 3 mm. longa, 3 interiora erecta late orbiculari-cordata vel reniformia, 6–7 mm. longa. *Stamina* 5. *Styli* 3, breves; stigmata capitata. *Fructus* trigonus, quam perianthii segmenta interiora subduplo brevior.—*Tragopyrum Billardieri*, Endl. Gen. Suppl. p. 54.—O. Stapf.

The Polygonaceous shrub here figured was first met with in the Lebanon by La Billardière about the year 1787, but was not described until 1844 when Jaubert and Spach named it *Atraphaxis Billardieri* in honour of its discoverer. The area of the species extends from eastern Greece to Asia Minor and Syria. It appears to be restricted to rather high elevations; in Greece it does not occur under 2000 feet above sea-level; in Crete it is only met with above 4500 feet; in Asia Minor and the Antilibanon it begins at 4000–5000 feet. The Greek specimens of this *Atraphaxis*, collected by Zuccarini in Aetolia and Euboea, were described by Meisner as varietally distinct, but this author's var. *graeca*, apart from

its occurrence at lower elevations, is distinguished mainly by the more attenuated, lanceolate and acute leaves, and subsequent authors have not recognised Meisner's variety. Another form, which has tetramerous flowers among the typically pentamerous ones, was described and figured by Jaubert and Spach (Ill. Pl. Or. vol. ii. p. 13, t. 110) as *A. variabilis*, and regarded by them as a distinct section (*Tragatraphaxis*) of the Linnean genus. Boissier, however, regarded this form as only a variety (var. *heterantha*) of *A. Billardieri*, and it differs in no other character from the form represented in our plate, which has been prepared from a plant in the collection at Kew, obtained by purchase from Mr. F. Sundermann of Lindau in 1903. The only other representative of the genus *Atraphaxis* which occurs in Europe is the Crimean *A. spinosa*, Linn. In Asia, however, the genus ranges rather widely from Sinai, Syria, Asia Minor and the Caucasus over the whole of Iran and Central Asia to Lake Baikal. It is a distinctly xerophytic type and includes about a score of species, similar in habit, which, notwithstanding their inconspicuous flowers, produce a pleasing effect in the more or less arid regions they occupy owing to the charming coloration of the persistent and accrescent perianth-segments. This characteristic is well manifested in *A. Billardieri* which, as grown on a slope in the Rock Garden at Kew, forms a dwarf semi-prostrate shrub, that thrives well and flowers freely every year in midsummer.

Description.—*Shrub*, $1\frac{1}{2}$–$2\frac{1}{2}$ ft. high, more or less prostrate, the sterile twigs often ultimately developing into spines; young shoots finely puberulous; the bark at length greyish-brown or grey. *Leaves* green, glabrous, short-petioled and jointed at the junction with the stalk; blade rather variable in outline, from ovate-obtuse low down to ovate-lanceolate or lanceolate and acute, $\frac{1}{8}$–$\frac{1}{5}$ in. long, rather thick, reticulately veined, with a slightly wavy margin; sheaths ultimately shorter than the internodes, with a distinct subulate hyaline tooth on each side. *Racemes* rather congested, up to 8-flowered, ending short leafy twigs; pedicels jointed near the middle, $\frac{1}{4}$–$\frac{1}{3}$ in. long, very slender. *Perianth-segments* at length very accrescent, rosy pink except at their greenish centres, the 2 outer wide-elliptic, reflexed, nearly $\frac{1}{3}$ in. long, the 3 inner erect, wide orbicular-cordate or reniform, $\frac{1}{4}$ in. long or longer. *Stamens* 5. *Styles* 3, short; stigmas capitate. *Fruit* trigonous, about half the length of the inner perianth segments.

Tab. 8820.—Fig. 1, flower; 2, the same with an inner segment removed; 3 and 4, stamens; 5, pistil:—*all enlarged.*

3

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4

M.S. del. J.N. Fitch. lith.

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Tab. 8821.

PRIMULA spicata.

Western Yunnan.

Primulaceae. Tribe Primuleae.

Primula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 631.

Primula (§ Soldanelloides) **spicata**, *Franch. in Bull. Soc. Bot. France.* vol. xxxii. p. 269 (1885); *Pax in Engl. Bot. Jahrb.* vol. x. p. 187 (1889); *Forbes et Hemsl. in Journ. Linn. Soc.* vol. xxvi. p. 43 (1889); *Pax in Engl. Pflanzenr., Primulaceae*, p. 70 (1905); *Balf. f. in Journ. Roy. Hort. Soc.* vol. xxxix. p. 153, fig. 58 (1913); *Irving in Gard. Chron.* 1918, vol. lxiv. p. 34, fig. 14; affinis *P. chasmophilae*, Balf. f., sed foliis in petiolum sensim cuneatis, pedunculo apicem versus et calyce farinoso, floribus spicatis coeruleis differt.

Herba monocarpica, usque ad 15 cm. alta. *Folia* radicalia, petiolata, oblongo-elliptica vel obovato-elliptica, basi in petiolum usque ad 2·5 cm. longum sensim cuneata, 1·5–4 cm. longa, 1–2 cm. lata, dupliciter serrato-crenata, tenuiter chartacea, utrinque breviter crispato-pubescentia; costa infra prominens, viridis, patule pilosa; nervi laterales utrinsecus circiter 5, prominuli, marginem versus furcati. *Flores* breviter spicati, patuli vel subreflexi, laxi, 4–8-nati; pedunculi graciles, usque ad 14·5 cm. longi, apicem versus albido-farinosi; bracteae oblongae, circiter 3 mm. longae. *Calyx* late campanulatus, 5 mm. longus, fere ad medium irregulariter 5-lobus, lobis integris vel 2-fidis, extra minute farinosus. *Corolla* coerulea; tubus inferne cylindricus, superne ampliatus, 1–1·3 cm. longus, extra minute puberulus; limbus 2 cm. expansus, profunde 5-lobus lobis 2-lobulatis mucronatis. *Antherae* 1·25 mm. longae, apice tubi cylindrici partis insertae. *Ovarium* subglobosum; stylus ovario aequilongus, stigmate capitato 2-lobulato coronatus.—*Primula delicata*, G. Forrest in Notes Roy. Bot. Gard. Edinb. vol. xix. p. 222 (1908).—J. Hutchinson.

The pleasing *Primula* now figured was first collected by the late Abbé Delavay in June, 1884, on Mount Tseng-chan, near Tali, in Western Yunnan, at about 7000 feet elevation. A year later it was described as *P. spicata* by the late Mr. Franchet. A member of the section *Soldanelloides*, this species is distinguished within that group by its loosely spicate flowers; in other species of the section the flowers are usually capitate. Except in this particular *P. spicata* most resembles *P. chasmophila*, Balf. f., figured at t. 8791 of this work. During September and October, 1906, *P. spicata* was

collected again at the rather higher altitude of 11,000 feet, by Mr. G. Forrest, on dry rocky slopes and ledges of cliffs in side valleys on the eastern flank of the Tali range. In August of the same year Forrest had gathered a smaller plant in the same neighbourhood. This the collector described as *P. delicata*, but it is now known that *P. delicata*, Forrest, is only a diminutive form of *P. spicata*. A decade later, seeds of *P. spicata* were collected on the Tali range by Mr. Forrest, and from these plants were raised by Messrs. Wallace, of Colchester. Our figure has been prepared from one of these plants which was presented to the Kew collection by Messrs. Wallace. There is no difficulty in rearing and growing this *Primula* from seed. Like so many other species from China and the Himalaya, *P. spicata* proves strictly biennial, and dies after flowering. Unfortunately at Kew it failed to produce seeds.

Description.—*Herb*, monocarpic, up to 6 in. in height. *Leaves* all radical, petioled, oblong- or obovate-elliptic, gradually narrowed at the base into a petiole up to 1 in. long, blade $\frac{2}{3}$–$1\frac{3}{4}$ in. long, $\frac{1}{3}$–$\frac{3}{4}$ in. wide, doubly serrate-crenate, thinly papery, shortly crisped-pubescent on both surfaces; midrib somewhat prominent beneath, with spreading hairs, lateral nerves about 5 along each side, rather raised and forked towards the edge. *Flowers* shortly spicate, spreading or somewhat reflexed, loose, 4-8 together; peduncle slender, nearly 6 in. long, whitish-mealy towards the top; bracts oblong, about $\frac{1}{8}$ in. long. *Calyx* wide-campanulate, $\frac{1}{5}$ in. long, irregularly 5-lobed almost to the middle, the lobes entire or 2-fid, finely mealy externally. *Corolla* blue; tube cylindric below, widened upwards, $\frac{1}{3}$–$\frac{1}{2}$ in. long, finely puberulous outside; limb $\frac{3}{4}$ in. across, deeply 5-lobed, lobes 2-lobulate and mucronate. *Anthers* $\frac{1}{20}$ in. long, inserted at the top of the cylindric portion of the tube. *Ovary* nearly globose; style about as long as the ovary, crowned by the capitate 2-lobulate stigma.

Tab. 8821.—Fig. 1, upper part of leaf; 2, calyx and pistil; 3, corolla in section, showing the staminal insertion; 4, pistil:—*all enlarged.*

MS. del. J.N. Fitch lith.

Vincent Brooks Day & Son Ltd imp.

L. Reeve & Co. London.

Tab. 8822.

COTYLEDON oppositifolia.

Caucasus.

Crassulaceae.

Cotyledon, *Linn., Benth. et Hook. f. Gen. Plant.* vol. i. p. 659.

Cotyledon oppositifolia, *Ledeb. ex Nordm. in Bull. Acad. Sci. St. Pétersb.* vol. ii. (1837) p. 313; herba perennis, foliis oppositis decussatis, floribus in paniculam laxam dispositis insignis.

Herba perennis, glabra, basi prostrata, radicans. *Caules* glabri, erecti, 15–25 cm. longi. *Folia* opposita, decussata, subcarnosa, breviter petiolata, elliptica vel ovato-elliptica, obtusa, crenata, 2·5–4·5 cm. longa, 1·5–3 cm. lata, planiuscula vel subconcava, glabra; petiolus circiter 1 cm. longus. *Racemi* ramosi, paniculam laxam formantes, multiflori; bracteae lineares, acutae, 2 mm. longae. *Flores* parvi, breviter pedicellati. *Calyx* 5-partitus; lobi ovato-oblongi, subobtusi, 1 mm. longi. *Corolla* ellipsoidea, 3–4 mm. longa, 5-fida, flavescens; lobi erecti, apiculati. *Stamina* 10; filamenta infra faucem corollae inserta. *Carpella* 5, 3 mm. longa; squamae nectariferae oblongae. *Capsulae* 5, apiculatae.—*Umbilicus oppositifolius*, Ledeb. Fl. Ross. vol. ii. p. 176; Boiss. Fl. Orient. vol. ii. p. 775.—R. A. Rolfe.

The Crassulaceous plant here figured appears to be rather rare in collections as well as in nature. It was originally collected in woods on the Abkhasia Range in the Caucasus, at the base of Mount Hirtscha, by Nordmann some eighty years ago, and Boissier has recorded its collection subsequently in the Caucasus by Owerin and by Radde. There is in the herbarium at Kew a specimen gathered by Nordmann and communicated by Ledebour, while there is another obtained in 1893 by Alboff, on alpine rocks on Mount Migaria. It is not certain how long it has been in cultivation in England or by whom it was first introduced; the material for our plate was supplied by Miss Willmott, in whose garden at Warley Place it flowered in June, 1916. A graceful plant, with opposite decussate, somewhat crenate flattish leaves and small yellow flowers borne on branched spikes so as to form an open panicle, the species is somewhat

remarkable in its natural family and its position is therefore rather open to dispute. When first described by Ledebour in 1837 its author placed it in the genus *Cotyledon*, as understood by Linnaeus, and named it *C. oppositifolia*. A few years later Ledebour, however, transferred it to the genus *Umbilicus*, as characterised by De Candolle in 1801, though to accommodate this Caucasus plant he defined a monotypic section *Chiastophyllum*. Boissier, in 1872, followed Ledebour's later treatment; Bentham and Hooker in 1865, however, found it preferable to merge *Umbilicus* as a whole in the genus *Cotyledon*. This treatment, which is followed here, renders it necessary to employ the earlier name, *Cotyledon oppositifolia*, proposed by Ledebour.

Description.—*Herb*, perennial, glabrous, prostrate and rooting below, with above glabrous erect stems 6–10 in. high. *Leaves* opposite, decussate, more or less fleshy, shortly petioled, elliptic or ovate-elliptic, obtuse, crenate, 1–1¾ in. long, ⅔–1¾ in. wide, nearly flat or slightly concave, glabrous; petiole about ⅓ in long. *Racemes* branched, spicate, many-flowered, arranged in a loose panicle; bracts linear, acute, 1/12 in. long. *Flowers* small, yellow, shortly pedicelled. *Calyx* 5-partite; segments ovate-oblong, somewhat obtuse. *Corolla* ellipsoid, ⅛–⅙ in. long, 5-fid; lobes erect, apiculate. *Stamens* 10; filaments inserted below the corolla throat. *Carpels* 5, ⅛ in. long; nectariferous scales oblong. *Capsules* 5, apiculate.

Tab. 8822.—Fig. 1, flower; 2, section of corolla, showing the stamens; 3, carpellary whorl, showing the nectariferous scales:—*all enlarged.*

M S del J.N.Fitch. lith

Vincent Brooks, Day & Son Lt^d imp.

L. Reeve & C^o London.

Tab. 8823.

EUONYMUS alatus.

North Eastern Asia.

Celastraceae. Tribe Celastreae.

Euonymus, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 360.

Euonymus alatus, *Regel, Fl. Ussur.* p. 40, t. 7 (1861); *Maxim. in Bull. Acad. Sci. St. Pétersb.* vol. xxvii. p. 453; *Loes. in Bot. Jahrb.* vol. xxix. p. 444; *Koch in Dendrol.* vol. i. p. 628; *Loes. et Rehd. in Plant. Wilson.* vol. i. p. 493; *Rehd. in Stand. Cycl. Hort.* vol. ii. p. 1186; *Bean in Trees and Shrubs, Brit. Isles*, vol. i. p. 537; species a caeteris hujus generis adhuc cultis cortice ramulorum suberoso in alas expanso facillime distinguenda; proxime accedit *E. verrucoso*, Scop., a quo cymis brevioribus capsulisque que altius lobatis etiam differt.

Frutex rigidior, laxius ramosus, 1·75–3-metralis, saepius quam altus latior; ramuli glabri, primum quadrati, demum secus angulos nunc duos nunc omnes alati; alae tenues compressae suberosae demum 0·6–1·2 cm. latae. *Folia* opposita, anguste ovalia vel obovata, apice acuta vel acuminata, basi cuneata margine minute serrata, 2·5–7 cm. longa, 0·6–2·5 cm. lata, glabra, per tempus aestivum saturate viridia, auctumno fere exacto vivide rubescentia; petiolus 3 mm. longus. *Cymae* axillares, saepissime 3-florae, 1·2–1·8 cm. longae; pedicelli graciles, glabri. *Flores* 4-meri, viride-lutei, 6 mm. lati. *Calyx* 4-lobus; lobi breviores, rotundati, minute denticulati. *Petala* 4, obovato-orbicularia, 2 mm. longa. *Stamina* 4; filamenta antheris vix aequilonga. *Ovarium* depressum, 4-loculare; stylus perbrevis, glaber. *Capsula* 4-loba, purpurea, laevis; lobi 8 mm. longi, prope basin tantum connati. *Semina* ovoidea, brunnea, 3 mm. longa, arillo kermesino induta.—*E. Thunbergiana*, Bl. Bijdr. Fl. Ned. Ind. p. 1147 (1825). *E. striata*, Loes. in Bot. Jahrb. vol. xxx. p. 463 (1902); C. K. Schneider in Handb. Laubholzk. vol. ii. p. 172 (1907). *Celastrus alatus*, Thunb. Fl. Jap. p. 98 (1784). *C. striatus*, Thunb. l.c.—W. J. Bean.

Euonymus alatus is found wild over a great area, and occurs in Japan, Manchuria, Amurland, North and Central China. We have not been able to trace its first introduction to this country, but it was cultivated in Berlin nearly sixty years ago. According to our experience at Kew it does not develop its handsome fruits very frequently in our climate, and we are indebted to Messrs. Waterer and Crisp of Bagshot for the specimens now figured. The species has, however, long been valued in gardens for its great autumnal

beauty, its leaves at that season turning to soft, rich shades of red. It may be described as one of the best hardy shrubs for autumnal colour, and when, as in 1917, to this is added the colour effect of its purple and scarlet capsules it becomes very attractive indeed. From all other cultivated Spindle-trees *E. alatus* is very distinct by reason of the conspicuous corky wings of the branches. From its nearest ally, *E. verrucosus*, it is well distinguished by this character, also by its shorter cymes and more deeply lobed capsules. *E. alatus* is very hardy, even in Central Europe, and likes a position exposed to full sunlight. It thrives in either a loamy or a peaty soil and, failing seeds, can be propagated by cuttings.

DESCRIPTION.—*Shrub* of stiff, open habit, 6–10 ft. high, usually wider than its height; branchlets glabrous, at first 4-angular and square, but afterwards developing along two or along all four angles a thin, flat, corky wing which becomes ultimately $\frac{1}{4}$–$\frac{1}{2}$ in. wide. *Leaves* opposite, narrowly oval or obovate, apex acute to acuminate, base cuneate, margin very finely serrate, 1–$2\frac{3}{4}$ in. long, $\frac{1}{4}$–1 in. wide, glabrous, dark green in summer, but changing to rich rosy red before falling in autumn; petiole $\frac{1}{8}$ in. long. *Cymes* axillary, usually 3-flowered, $\frac{1}{2}$–$\frac{3}{4}$ in. long; pedicels glabrous, slender. *Flowers* 4-merous, greenish-yellow, $\frac{1}{4}$ in. in diameter. *Calyx* 4-lobed, the lobes shallow, rounded, minutely dentate. *Petals* 4, obovate-orbicular, $\frac{1}{12}$ in. long. *Stamens* 4; filaments scarcely as long as the anthers. *Ovary* flat, 4-celled; style very short, glabrous. *Capsule* 4-lobed, purple, smooth; the lobes $\frac{1}{3}$ in. long, united only at the base. *Seeds* brown, ovoid, $\frac{1}{8}$ in. long, enclosed by a scarlet arillus.

TAB. 8823.—Fig. 1, part of stem; 2, part of leaf margin; 3, part of inflorescence; 4, calyx and pistil; 5 and 6, stamens; 7, section of ovary; 8, section of seed:—*all enlarged.*

M.S.del. J.N.Fitch. lith.

Vincent Brooks, Day & Son Lt.d imp.

L. Reeve & Co. London.

Tab. 8824.

THORNCROFTIA longiflora.

Transvaal.

Labiatae. Tribe Ocimoideae.

Thorncroftia, *N. E. Brown in Kew Bull.* 1912, p. 281.

Thorncroftia longiflora, *N. E. Brown*, l.c.; species unica.

Herba perennis, ubique dense puberula. *Caules* erecti, ad 6 dm. alti, ramosi, juventute plus minusve rubri, demum sublignosi. *Folia* breviter petiolata, elliptico-lanceolata, obtusa, integra vel obscure paucidentata, basi in petiolum cuneatim angustata, crassiuscula, petiolo incluso 0·5–2 cm. longa, 1·5–10 mm. lata, glandulis immersis densissime instructa. *Verticillastri* 2-flori racemos 3–10 cm. longos in paniculam terminalem ad 13 cm. longam dispositos formantes; internodia inter verticillastros 3–10 mm. longa. *Bracteae* foliis similes, gradatim minores, supremae minimae, sessiles. *Pedicelli* 3–5 mm. longi. *Calyx* campanulatus, 2-labiatus, 4 mm. longus, fructiferus circiter 6 mm. longus, conspicue 10-nervus, glandulis sessilibus instructus; labium posticum integrum, ovatum, acutum, in tubum decurrens; labium anticum 4-dentatum, dentibus anguste deltoideis acutis. *Corolla* pallide rosea lobis lateralibus labii antici maculis elongatis rubris ornatis; tubus rectus, anguste cylindricus, fauce haud ampliatus, 2·5–2·8 cm. longus, 1·5–2 mm. latus; limbus 2-labiatus, glandulis sessilibus instructus; labium posticum cuneato-obovatum, emarginatum, concavum, 7–10 mm. longum, 6–7 mm. latum; labium anticum 3-partitum; lobus intermedius ellipticus, leviter carinatus, basi unguiculatus, 6–9 mm. longus, 3·5–5 mm. latus; lobi laterales lineari-lanceolati, acuti, 5–7 mm. longi, 1–1·5 mm. lati. *Stamina* 4, declinata, exserta; filamenta libera, glabra, 7–9 mm. longa; antherarum loculi ovoidei, divaricati, apice confluentes. *Discus* parvus, antice in glandulam tumens. *Stylus* filiformis, exsertus, subaequaliter 2-fidus. *Nuculae* subtrigono-obovoideae, glabrae, apice leviter corrugatae.—S. A Skan.

The genus *Thorncroftia*, of which the species now figured is the only one at present, is a native of the Transvaal, where it was collected at Barberton by Mr. J. N. Thorncroft, growing among rocks at an elevation of 4000 feet, in 1911. When describing the genus Mr. N. E. Brown expressed the opinion that *T. longiflora* in general appearance resembles *Syncolostemon densiflorus*, Benth., so closely that when not in flower the two might possibly be mistaken. When in blossom, however, the two are very easily distinguished since in *Thorncroftia*

the limb of the corolla is 4-lobed whereas in *Syncolostemon* the limb is composed of two entire or only slightly lobed lips. The 3-partite lower lip of the corolla and the deeply 2-fid style separate *Thorncroftia* from *Orthosiphon*. For the introduction of *T. longiflora* to European collections, horticulture is indebted to the collector in whose honour it has been named. From seeds sent by him to Mr. R. Irwin Lynch, Curator of the Cambridge Botanic Garden, plants were successfully raised and have thriven best under the treatment as regards potting, soil and watering usual for succulent plants, though they succeed satisfactorily in any greenhouse or intermediate house with good light. Under cultivation *T. longiflora* forms a small shrub of loose habit with succulent leaves and is not particularly attractive save when in flower, when it is somewhat remarkable for the long slender tube of the corolla. For the material for our plate we are indebted to Mr. Lynch who supplied it from one of the plants which flowered at Cambridge in November, 1916.

DESCRIPTION.—*Herb*, perennial, densely puberulous throughout. *Stems* erect, up to 2 ft. high, branched, when young more or less red, ultimately rather woody. *Leaves* short-petioled, elliptic-lanceolate, obtuse, entire or obscurely sparingly toothed, cuneately narrowed into the petiole below, rather thick, including the petiole $\frac{1}{5}$–$\frac{3}{4}$ in. long, up to $\frac{1}{3}$ in. wide, densely beset with sunk glands. *Verticillasters* 2-flowered, forming racemes $1\frac{1}{4}$–4 in. long which are grouped in a terminal panicle over 5 in long; nodes between the verticillasters $\frac{1}{8}$–$\frac{1}{3}$ in. long. *Bracts* like the leaves, progressively smaller upwards, the highest very small, sessile. *Pedicels* $\frac{1}{8}$–$\frac{1}{5}$ in. long. *Calyx* campanulate, 2-lipped, $\frac{1}{6}$ in. long, enlarging and about $\frac{1}{4}$ in. long in fruit, distinctly 10-nerved, beset with sessile glands; upper lip entire, ovate, acute, decurrent in the tube; lower lip 4-toothed with the teeth narrow deltoid, acute. *Corolla* pale rose, the lateral lobes of the lower marked with red; tube straight, narrow cylindric, not enlarged at the mouth, 1–$1\frac{1}{8}$ in. long, under $\frac{1}{10}$ in. wide; limb 2-lipped, beset with sessile glands; upper lip cuneate-obovate, emarginate, concave, $\frac{1}{4}$–$\frac{2}{5}$ in. long, about $\frac{1}{4}$ in. wide; lower lip 3-partite, the middle lobe elliptic, faintly keeled, the base clawed, $\frac{1}{4}$–$\frac{1}{3}$ in. long, $\frac{1}{7}$–$\frac{1}{5}$ in. wide; lateral lobes linear-lanceolate, acute, about $\frac{1}{4}$ in. long, very narrow. *Stamens* 4, declinate, exserted; filaments free, glabrous, $\frac{1}{4}$–$\frac{1}{3}$ in. long; anther-cells ovoid, divaricate, confluent at their tips. *Disk* small, swollen in front. *Style* filiform, exserted, 2-fid. *Nutlets* somewhat trigonously obovoid, glabrous, slightly corrugated at the top.

TAB. 8824.—Fig. 1, a leaf; 2, a flower; 3, calyx, laid open, showing pistil and disk; 4, upper part of corolla, showing stamens; 5, upper part of corolla, laid open, showing stamens, the upper lip and the mid-lobe of the lower lip removed; 6 and 7, anthers with upper portion of filaments:—*all enlarged*.

M.S.del.J.N.Fitch.lith.

Vincent Brooks Day & Son Lt.d imp

L. Reeve & Co. London.

Tab. 8825.

SIGMATOSTALIX costaricensis.

Costa Rica.

Orchidaceae. Tribe Vandeae.

Sigmatostalix, *Reichb. f.*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 565.

Sigmatostalix costaricensis, *Rolfe in Kew Bulletin*, 1916, p. 78; affinis *S. Eliae*, Rolfe, sed sepalis petalisque longioribus et labello sagittato-cordato differt.

Herba pseudobulbis approximatis ovato-oblongis compressis acutangulis 2–2·5 cm. longis, apice monophyllis, basi 2–3-phyllis. *Folia* oblongo-lanceolata, subacuta, 5–12 cm. longa, 1·2–2 cm. lata. *Scapi* graciles, 15–20 cm. longi, multiflori; bracteae ovato-lanceolatae, acutae, 3 mm. longae; pedicelli 4 mm. longi. *Flores* parvi. *Sepala* et *petala* reflexa, lanceolata, acuta, 8–9 mm. longa. *Labellum* patens, unguiculatum, sagittato-ovatum, subconvexum, minute apiculatum, 6 mm. longum, 5 mm. latum; lobi laterales recurvi, 1 mm. longi; unguis 2 mm. longus; crista suberecta, dentiformis, subobtusa. *Columna* arcuata, 0·6 cm. longa, basi gracilis; alae subobsoletae. *Pollinia* pyriformia; stipes oblongus; glandula squamiformis. —R. A. Rolfe.

The interesting Orchidaceous genus *Sigmatostalix* includes about a dozen species, the majority of which are characteristic of the Andes from Peru northwards to New Granada. It is one of the rather numerous small genera recognised within the sub-tribe *Oncidieae* of the tribe *Vandeae*, and is especially distinguished by the unguiculate suberect lip, which is usually truncate or sagittate at the base, as well as by the elongated column. The genus, which now for the first time finds a place in this work, extends beyond the Andes, for *S. costaricensis*, the species now figured, was discovered in Costa Rica by Mr. C. H. Lankester, who sent a living plant to Kew which flowered in the collection in October, 1915, and remained in bloom for a considerable time; our drawing was made in December of that year. Though the interest attaching to this species is mainly botanical, it is nevertheless a very graceful little plant, in general appearance not unlike a small *Oncidium*, with the flowers borne on an elongated spike. The sepals and petals are

narrow and considerably reflexed, and are pale green with a brown central stain; the sagittately cordate lip is deep red-brown with a yellow apex. It thrives satisfactorily in a house devoted to species of *Oncidium* and other orchids requiring intermediate conditions.

DESCRIPTION.—*Herb* with close-set ovate-oblong compressed and angled pseudobulbs, ¾–1 in. long, 1-foliate at the apex and 2–3-foliate at the base. *Leaves* oblong-lanceolate, somewhat acute, 2–5 in. long, ½–¾ in. wide. *Scapes* slender, 6–8 in. long, many-flowered; bracts ovate-lanceolate, acute, ⅛ in. long; pedicels ⅙ in. long. *Flowers* small. *Sepals* and *petals* reflexed, lanceolate, ⅓ in. long. *Lip* spreading, clawed, sagittate-ovate, somewhat convex, finely apiculate, ¼ in. long, ⅕ in. wide; lateral lobes recurved, ¼ in. long; claw ½ in. long; crest nearly erect, tooth-like, rather blunt. *Column* arcuate, ¼ in. long, with a slender base; wings almost absent. *Pollinia* pyriform; stipe oblong; gland scale-like.

TAB. 8825.—Fig. 1, flower; 2, lip; 3, anther-cap; 4, pollinarium:—*all enlarged.*

M.S. del. J.N Fitch. lith.

Vincent Brooks, Day & Son Lt.d imp

L. Reeve & Co. London

Tab. 8826.

ROSA glutinosa, var. dalmatica.

Dalmatia.

Rosaceae. Tribe Roseae.

Rosa, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. i. p. 625.

Rosa glutinosa, *Sibth. et Sm.*, var. **dalmatica,** *Borbas, Prim. Ros. Monogr. Hung.* p. 501; *Beck et Szysz. Pl. Cernagor. et Albania*, p. 111, t. 4, fig. j–k.; *Rolfe in Kew Bulletin*, 1918, p. 156; a *Rosa glutinosa*, Sibth. et Sm., typica aculeis longioribus et rectis, foliolis minus pilosis, fructu ovoideo et majore differt.

Fruticulus nanus, erectus, vix 0·5 m. altus; rami aculeatissimi; aculei inaequales, recti, 0·4–0·8 cm. longi, glandulis brevibus interspersis. *Folia* 6–11 cm. longa, saepissime 7-foliolata; rhachis crebre et breviter glandulosa, subtus sparse aculeata; foliola breviter petiolulata, late elliptica vel obovato-elliptica, obtusa, 2-serrata, subcoriacea, 1–2·5 cm. longa, 0·8–1·7 cm. lata, utrinque glandulosa; stipulae superne dilatatae, auriculis obtusiusculis divergentibus, subtus et margine dense glandulosae. *Flores* terni vel solitarii, 3–3·5 cm. diametro; pedicelli 1–1·5 cm. longi, crebre glandulosi. *Receptaculum* subglobosum, 0·7 cm. longum, crebre setoso-glandulosum. *Calycis* lobi triangulari-lanceolati, caudato-acuminati, 1–1·2 cm. longi, patentes, extra crebre glandulosi. *Petala* late obcordata, rosea, 1·5–1·8 cm. longa. *Filamenta* glabra, 3–4 mm. longa. *Carpella* longe villosa; styli 0·5 mm. longi. *Fructus* ellipsoideus, setoso-glandulosus, aurantiaco-ruber, 2–2·8 cm. longus, calycis lobis persistentibus coronatus.—*R. dalmatica*, A. Kern. in Oester. Bot. Zeitschr. 1870, p. 10. *R. glutinosa*, Baker in Wilmott, Rosa, p. 467, tab.; non Sibth. et Sm.—R. A. Rolfe.

The striking Rose here figured has been in cultivation in the Kew collection as *Rosa glutinosa* since 1896, in which year the plant from which the material for our plate has been derived was received from Darmstadt under this name. This plant is conspicuous in the collection by its dwarf habit and its gooseberry-like fruits which ultimately assume an orange-red colour. In Miss Wilmott's magnificent monograph of the genus *Rosa* this is figured under the Darmstadt name. It has long been suspected, however, that there was some confusion and that this is not the original *R. glutinosa* of Sibthorp and Smith. An exhaustive comparison of the material preserved at Kew and in the Natural History Museum and the examination of the original Sibthorpian type at Oxford enabled Mr. Rolfe in 1918 to state definitely that

the Darmstadt *R. glutinosa* is the plant described and figured by Kerner in 1870 as *R. dalmatica.* Kerner's plant was collected, probably in 1869, by Mr. F. Maly on Mount Bila-Gora, near Cattaro in Southern Dalmatia. Living plants were transmitted to Vienna and distributed thence, so that it is not impossible that the Kew plant is one derived from this source. Borbas has regarded this Dalmatian Rose as a variety of *R. glutinosa*, but has recognised the marked difference in the shape of the fruit as seen in cultivation. In *R. glutinosa* proper the fruits are globose, not ovoid. In adopting the arrangement proposed by Borbas we would point out that the precise relationship of the Dalmatian plant to *R. glutinosa* is not yet clear. It certainly belongs to the group of Roses from South-eastern Europe and Asia Minor with a close affinity to the *Rubiginosae* or Sweet Briars. To the group in question Crepin assigned the name *Orientales*, and treated it as a section which includes *R. glutinosa* and various other forms, some of which are still imperfectly known. The dwarf compact habit of *R. glutinosa* var. *dalmatica* makes it suitable for the Rock Garden or for positions where it is not likely to be overgrown by shrubs of coarser habit. Its flowers are pleasing and the conspicuous covering of glandular hairs makes it interesting, but its greatest beauty is seen in autumn when its bright and bristly fruits are ripe. For so dwarf a rose they are noticeably large. The plant must have a sunny position and prefers a rather heavy loamy soil.

Description.—*Shrub*, erect, but dwarf, hardly more than $1\frac{1}{2}$ ft. high; branches very prickly, the prickles unequal, straight, $\frac{1}{6}$–$\frac{1}{3}$ in. long, intermixed with short glands. *Leaves* $2\frac{1}{4}$–$4\frac{1}{2}$ in. long, usually 7-foliolate; rachis closely and shortly glandular, sparing prickly on the lower face; leaflets shortly petiolulate, wide-elliptic or obovate-elliptic, obtuse, doubly serrate, rather firm, $\frac{1}{3}$–1 in. long, $\frac{1}{2}$–$\frac{2}{3}$ in. wide, glandular on both surfaces; stipules dilated upwards, with rather blunt diverging auricles, densely glandular on the edge and underneath. *Flowers* in threes or solitary, $1\frac{1}{4}$–$2\frac{1}{2}$ in. across; pedicels $\frac{1}{3}$–$\frac{2}{3}$ in. long, closely glandular. *Receptacle* almost globose, $\frac{1}{4}$ in. long, closely setose-glandular. *Calyx-lobes* triangular-lanceolate, caudate-acuminate, $\frac{1}{3}$–$\frac{1}{2}$ in. long, spreading, closely glandular externally. *Petals* wide-obcordate, rose-pink, $\frac{2}{3}$–$\frac{3}{4}$ in. long. *Filaments* glabrous, $\frac{1}{8}$–$\frac{1}{6}$ in. long. *Carpels* villous with long hairs; styles short. *Fruit* ellipsoid, setose-glandular, orange-red, $\frac{3}{4}$–$1\frac{1}{8}$ in. long, crowned by the persistent calyx-lobes.

Tab. 8826.—Fig. 1, portion of stem, showing the armature; 2, apex of leaflet, showing serration and glandular covering; 3, portion of leaf-margin; 4, vertical section of flower, the petals removed; 5, a carpel:—*all enlarged.*

M.S. del. Mintorn

Vincent Brooks, Day & Son Lit.d imp.

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Tab. 8827.

CAMPANULA sulphurea.

Orient.

Campanulaceae. Tribe Campanuleae.

Campanula, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 599.

Campanula sulphurea, *Boiss. Diagn.* ser. i. p. 64 et *Fl. Or.* vol. iii. p. 930; *Post, Fl. Syr. Palest. et Sinai,* p. 505; *Muschler, Man. Fl. Egypt,* vol. ii. p. 945; species *C. strigosae,* Russ., affinis sed calycis laciniis apice haud subulatis et corolla intense lutea distinguitur.

Herba annua, caulibus saepissime patule ramosis vel interdum fere simplicibus plus minusve strigoso-hirsutis. *Folia* caulina oblongo-linearia, apice obtusa, basi rotundata, usque ad 1·6 cm. longa et 5 mm. lata, strigoso-hirsuta, margine strigoso-ciliata, costa nervisque inconspicuis, sessilia. *Flores* terminales vel axillares; florum axillarium pedicelli usque ad 3 cm. longi; bracteae bracteolaeque foliis similes nisi minores. *Receptaculum* late obconicum, glabrum. *Calycis* laciniae lanceolatae, acutiusculae, 1·2 cm. longae, 3 mm. latae, margine et interdum ad costam strigoso-ciliatae; appendiculae ovatae, obtusae, 4 mm. longae, valde strigoso-hirsutae. *Corolla* campanulata, glabra, intense lutea, circiter 2 cm. longa, fauce 1 cm. diametro, 5-lobo, lobis oblongo-ovatis 9 mm. longis 5 mm. latis. *Stamina* filamentis planis 2·25 mm. longis, 2 mm. latis, parte superiore ciliata excepta glabris, antheris 4 mm. longis. *Stylus* stigmatibus tribus 2·5 mm. longis inclusis 1·1 cm. longus, inferne glaber, superne dense pubescens. *Capsula* nutans, breviter obconica.—W. B. Turrill.

The *Campanula* here figured inhabits dry, sandy places in the coastal districts of Syria and Palestine. It has also been recorded from the Isthmic Desert and the northern parts of the Arabian Desert within Egyptian territory. Its nearest allies in the genus are *C. strigosa,* Russ., figured at t. 5068 of this work, *C. Reuteriana,* Boiss. et Bal., and *C. hierosolymitana,* Boiss., all oriental species, in which the corollas are blue or violet. In *C. sulphurea* the corolla is of an intense yellow colour, a character which at once marks it off from the three nearly related species mentioned. The plant figured in our plate was raised at Kew from seed presented by Major P. M. Armitage, Great Budworth, Northwich, who had received a supply from Palestine in 1917. The plants in cultivation at Kew, though they flowered freely

in October, 1917, did not ripen seed. In 1918 some seed, saved from the gift of the previous year, was sown in March, and the resulting plants, grown in pans in a frame, flowered freely in July. The species unfortunately cannot be said to be hardy at Kew, and although it can be raised satisfactorily in pots, provided freshly imported seeds are available, its liability to attack by slugs makes it difficult to preserve in a rock garden or elsewhere out of doors.

DESCRIPTION.—*Herb*; annual; stems usually spreadingly branched, sometimes nearly simple, more or less strigose-hirsute. *Leaves* of the stem sessile, oblong-linear, obtuse, rounded at the base, up to $\frac{2}{3}$ in. long and $\frac{1}{5}$ in. broad, strigose-hirsute, with a strigose-ciliate margin; midrib and lateral nerves inconspicuous. *Flowers* terminal or axillary; pedicels of axillary flowers up to $1\frac{1}{5}$ in. long; bracts and bracteoles resembling the leaves, but smaller. *Receptacle* broadly obconic, glabrous. *Calyx-segments* lanceolate, somewhat acute, $\frac{1}{2}$ in. long, $\frac{1}{8}$ in. broad, strigose-ciliate on the margins and sometimes on the midrib; appendages ovate, obtuse, $\frac{1}{6}$ in. long, strongly strigose-hirsute. *Corolla* campanulate, glabrous, deep yellow, about $\frac{4}{5}$ in long, the throat $\frac{2}{5}$ in. in diameter, 5-lobed, the lobes oblong-ovate, acute, $\frac{3}{8}$ in. long, $\frac{1}{5}$ in. broad. *Stamens* with flattened filaments nearly $\frac{1}{10}$ in. long, $\frac{1}{12}$ in. broad, the upper part ciliate, otherwise glabrous; anthers $\frac{1}{6}$ in. long. *Style* nearly $\frac{1}{2}$ in. long including the 3 stigmas which are $\frac{1}{10}$ in. long, glabrous below, densely pubescent above. *Capsule* nodding, shortly obconic.

TAB. 8827.—Fig. 1, a flower-bud; 2 and 3, stamens; 4, style and stigma:—*all enlarged*.

M S del J N W Lith

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Tab. 8828.

HAWORTHIA Chalwini.

South Africa.

Liliaceae. Tribe Aloineae.

Haworthia, *Duval*; *Benth. et Hook. f. Gen. Plant.* vol. iii. p. 777.

Haworthia (§ Coarctatae) **Chalwini**, *Marloth et Berger in Notizbl. K. Bot. Gart. Berlin*, vol. iv. p. 247 (1906); *Marloth, Fl. S. Africa*, vol. iv. p. 89, t. 22, fig. A (1915); *Berger in Engl. Pflanzenr. Liliac.-Asphod.-Aloin.* p. 85 (1908); species ex affinitate *H. Reinwardtii*, Haw., a qua foliis brevioribus ovato-deltoideis supra planis differt.

Herba succulenta. *Caulis* foliatus, erectus, 12 cm. altus, foliis inclusis 3–3·5 cm. diametro. *Folia* dense imbricata, ovato-deltoidea apice incurvata, 23 mm. longa, 15 mm. lata, 5–6 mm. crassa, aereo-purpurea, supra plana leviaque, subtus basi levia, besse superiori longitudinaliter circiter 13-striata, lira media prominenti, verrucis margaritaceis seriatim dispositis ornata. *Pedunculus* tenuis, 25 cm. altus; racemus 5 cm. longus, pauciflorus; bracteae ovatae, 2 mm. longae; pedicelli 4 mm. longi. *Perianthium* 15 mm. longum, urceolatum, 2-labiatum, basi viride, parte media dilute roseum, apice album; lobi oblongi, obtusi. *Stamina* inclusa. *Ovarium* oblongum.—C. H. Wright.

The South African genus *Haworthia*, according to the recent monograph which we owe to Mr. A. Berger, includes some three score species, and it is somewhat remarkable that in the case of five-sixths of the species enumerated in the 'Flora Capensis' the precise habitat was unknown in 1896. Most of these species were introduced to cultivation in Europe towards the close of the 18th and the beginning of the 19th Centuries, during a period when the growing of succulent plants was much in vogue. Many of these were first described by the late Mr. A. H. Haworth, one of the founders of the Hull Botanic Garden, in whose honour Mr. H. A. Duval named the genus to which the plant here figured belongs. A few of the members of this genus had been described by earlier authors as species of *Aloe*, from which, however, *Haworthia*, as understood by Duval, differs in having a perianth with an oblong tube and a bilabiate

limb. The only species of *Haworthia* recorded from outside South Africa is the Angolan *H. angolensis*, Baker, but it now appears that this exception is only apparent, for *H. angolensis* has been transferred by Berger to his genus *Chortolirion* as *C. angolense*. The genus *Chortolirion*, Berger, was founded for the reception of those species referred by Baker and Engler to *Haworthia* which differ from the true Haworthias in having their leaves narrow and comparatively thin above, but wide and conniving in a bulb-like fashion below. The subject of our plate, *H. Chalwini*, is a very striking species of columnar habit; it bears most resemblance to *H. Reinwardtii*, Haw., with which it agrees in the bronze-purple colour of the leaves and in the pearly protuberances on their under and outer surface. The material for our figure has been derived from a plant raised from a cutting presented by Dr. Marloth in 1913. This plant flowered in a succulent house at Kew for the first time in October, 1916.

DESCRIPTION.—*Herb*, succulent; stem leafy, erect, 5 in. high, including the leaves $1\frac{1}{4}$–$1\frac{1}{2}$ in. thick. *Leaves* closely imbricate, ovate-deltoid with an incurved tip, nearly 1 in. long, $\frac{2}{3}$ in. wide and $\frac{1}{4}$ in. thick, bronze-purple, smooth and flat above, smooth near the base beneath, the upper two-thirds about 13-striate longitudinally, the central ridge distinct, and like the rest ornamented with serially arranged pearly-white warts. *Peduncle* slender, 10 in. high; raceme 2 in. long, few-flowered; bracts ovate, $\frac{1}{12}$ in. long; pedicels $\frac{1}{6}$ in. long. *Perianth* $\frac{2}{3}$ in. long, urceolate, 2-lipped, green at the base, pale rose in the centre and white at the tip; lobes oblong, obtuse. *Stamens* included. *Ovary* oblong.

TAB. 8828.—Fig. 1, flower; 2 and 3, stamens; 4, pistil:—*all enlarged.*

2

5

1

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Tab. 8829.

GAULTHERIA cuneata.

Western Szechuan.

Ericaceae. Tribe Andromedeae.

Gaultheria, *Linn.*; *Benth. et Hook. f. Gen. Plant.* vol. ii. p. 582.

Gaultheria cuneata, *Bean*; species nova sinensis, *G. pyroloidei*, Miq., e Japonia et *G. pyrolaefoliae*, Hook. f., ex Himalaya orientali quam maxime affinis, ab ambabus tamen foliis angustioribus, ovario fructuque dense pilosis apte distinguenda.

Fruticulus nanus sempervirens, 0·3–0·5 m. altus; coma compacta densiuscula; novelli crebre foliati, dense pubescentes. *Folia* alterna, persistentia, coriacea, obovata vel anguste ovalia, acuta, basi cuneata, breviter crenulata crenulis singulis apice glandulosis, 1·2–2·8 cm. longa, 0·6–1·2 cm. lata, supra saturate viridia, nitida, glabra, subtus pallidiora, nitida, glandulis parcis punctata, nervi laterales supra impressi, subtus prominuli; petiolus 1·5 mm. longus. *Racemi* puberuli, 2·5–3·8 cm. longi, terminales et axillares; pedicelli puberuli, 2-bracteolati, bracteolis scariosis. *Flores* albi, cernui, aestate adulta aperti. *Calyx* albescens, 5-lobus, lobis triangulari-ovatis, 2 mm. longis, minute ciliatis. *Corolla* alba, urceolata, 6 mm. longa, 5-dentata, dentibus perbrevibus recurvis. *Stamina* 10, inclusa; filamenta puberula, basin versus incrassata; antherae 2-lobae, lobis singulis apice 2-cornutis; pollen album. *Ovarium* 5-gonum, dense sericeo-puberulum; stylus columnaris, glaber, corolla aequilongus. *Fructus* 5-lobus, pubescens, capsularis, nisi ipso apice calyce albo accrescente carnoso involutus ideoque baccam albam globosam 9 mm. latam simulans. *Semina* plurima, minuta, brunnea, nitida.—*G. pyroloides*, Miq., var *cuneata*, Rehd. et Wils. in Plant. Wilson. vol. i. p. 554.—W. J. Bean.

The Chinese *Gaultheria* now figured was originally described by Messrs. Rehder and Wilson as a variety, var. *cuneata*, of *G. pyroloides*. The name *G. pyroloides* was originally given in 1864 by Miquel to a Japanese plant which he had identified (Ann. Mus. Bot. Lugd.-Bat. vol. i. p. 30) with one collected by Sir Joseph Hooker in Sikkim in 1849. The name he used was attributed by Miquel to Hooker and Thomson. But these authors never published such a name, although we know that Hooker at one time intended to call the

Sikkim plant "pyrolaefolia," that word being inscribed, in his own handwriting, on the original sheet in the herbarium at Kew. When drafting the account of the *Ericaceae* for the 'Flora of British India' in 1882, Mr. C. B. Clarke made use of this indication and described the Sikkim *Gaultheria* as *G. pyrolaefolia*, Hook. f. No reference is made by Clarke to the misreading of Hooker's name by Miquel or to its employment by the latter to designate a plant from Japan. Nor was there any obligation to do so, since a critical examination of the available material of both plants proves that the Japanese and the Sikkim plants are very distinct species. It is found too that the Chinese plant now figured is equally distinct from the two with which it has been nominally confused. In the Sikkim plant, *G. pyrolaefolia*, Hook. f. ex C. B. Clarke, the leaves are few in number and are situated near the end of the twigs, rounded-obovate or nearly orbicular; the anther appendages are shorter than the anther-cells; the style is much shorter than the corolla-tube and the ovary is glabrous. In the Japanese plant, *G. pyroloides*, Hook. f. and Thoms. ex Miq., the leaves are numerous, more or less elliptic; the anther-appendages are longer than the anther-cells; the style reaches the top of the corolla; the ovary and fruit are glabrous as in the Sikkim species. Our Chinese plant, *G. cuneata*, Bean, differs from the other two both in its narrowly obovate to oblanceolate leaves and in its densely hairy ovary and fruit. It is a neat dwarf evergreen, perfectly hardy so far as our present experience goes. The plant from which our figure was prepared was raised at Kew from seed sent to Kew from the Arnold Arboretum in 1909. The seed had been collected the previous autumn in Western Szechuan by Mr. E. H. Wilson, who states that the plant grows in woodlands, nearly always on rocks. It thrives under the same conditions as the other Gaultherias, which love a moist peaty soil. Propagation is easily assured by its plentiful seeds. The Gaultherias are interesting on account of their curious fruits. Commonly spoken of as berries, and to all appearance such, they are in reality 5-lobed capsules almost completely enveloped when ripe by the calyx which with age enlarges, becomes fleshy, and is

often coloured. In *G. cuneata*, however, it happens to be white.

DESCRIPTION.—*Shrub*, evergreen, 1–1½ ft. high, of close compact habit; young shoots very leafy, densely pubescent. *Leaves* alternate, persistent, coriaceous, obovate or narrowly oval, acute, cuneate at the base, shallowly crenulate, each tooth tipped with a dark gland; ½–1⅛ in. long, ¼–½ in. wide; dark shining green and glabrous above, paler shining green and sparingly dotted with glands beneath; nerves sunk above, prominent beneath; petiole $\frac{1}{16}$ in. long. *Racemes* puberulous, 1–1½ in. long, terminal and axillary; pedicels puberulous, furnished with two scarious bractlets. *Flowers* white, cernuous, opening from midsummer onwards. *Calyx* whitish, 5-lobed, the lobes triangular-ovate, $\frac{1}{12}$ in. long, minutely ciliate. *Corolla* white, urceolate, ¼ in. long, with five very small recurved lobes. *Stamens* 10, enclosed; filaments puberulous, swollen towards the base; anthers 2-lobed, each lobe terminated by two slender horns; pollen white. *Ovary* pentagonous, silky-puberulous; style glabrous, columnar, as long as the corolla. *Fruit* a 5-lobed, many-seeded, pubescent capsule, enclosed except at the top by the calyx become white and fleshy, the whole resembling a globose, white berry, ⅜ in. wide. *Seeds* minute, shining, brown.

TAB. 8829.—Fig. 1, portion of leaf; 2, flower; 3 and 4, stamens; 5, pistil; 6, section of fruit, showing the capsule nearly enclosed by the white, fleshy, accrescent calyx; 7, seed:—*all enlarged*.

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